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Generation 7 Samsung Heat Pump & Kodiak Pre-Plumb Cylinder Installation Manual

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ENG-0025-06

Heat Pump Commissioning Sheet For Extended Warranty (7 Years)

MUST BE COMPLETED AND THEN REGISTERED ONLINE TO COMPLETE WARRANTY

Home owner		Company Name	
Address		Company/Installer Address	
Contact No.		Installer Name	
Email		Contact Number	
Date Unit Installed		Email	
Date Unit Commissioned		EHS Approved Installer?	
Has customer training been carried out?	Y N	Will you be maintaining the unit?	Y N

Outdoor Unit Information

(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Model Number		Serial Number	
Unit Location		Header/Buffer Tank /HEX installed?	

Strainer		Glycol added		Glycol Concentration	
Fuse Rating		Mains Cable Size		Space around unit	
Drainage For Outdoor Unit		Approx System Volume (L)		Unit Correctly Mounted	
Water System Flushed				Water System Filled And Purged	
Flow sensor fitted				Flow And Return Lines Insulated	

*Glycol level around 20% +- 2% check with glycol manufacturer for details

Outdoor Unit Operation Data

Power Supply		Running Amps		Delta T (ΔT)	
Ambient Temp		Air In Temp (Taken manually at the back of the unit)		Air Out Temp (Taken manually at the front of the unit)	
Return Temp In		Flow Temp Out			

Please continue on next page

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Heating Controls

(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Ground Floor Heat Emitter		Type of Control Used		Serial Number	
1st Floor Heat Emitter		Type of Control Used		Blending Valve Fitted	

Type of control i.e. Underfloor heating system, programmable room stat, etc.

Tank And Control Kit (MIM) Information

(Please ensure photos of the Serial numbers & Model numbers are available for online warranty registration)

Tank Manufacturer		Model Number		Serial Number	
Control Kit Model No. (CN\DN)		Control Kit Serial No.		Control Kit Location Cylinder Mounted (Y/N?)	
Tank Capacity (L)		Solar Installed		Blending Valve Fitted	
Cylinder water Temp at Startup		Cylinder water Temp after 30mins		Water Flow Rate (L/min) (in heating mode)	
Fuse Rating For Mim Unit		Cable Size		Water Flow Rate (L/min) (in DHW mode)	
Immersion Heater Volts		Flow And Return Lines Insulated		Benchmark Book Completed	
Tank Sensor Fitted		Vented or Unvented			

Space Heating Field Settings

Menu Code	Function	Default	For installer use
201*	Outdoor Temp. for Water law (Heat)	Low: 15.0°C High:2.0°C	
202*	Water Out Temp. for WL1 Heat (WL1-Floor)	Low: 35.0°C High:45.0°C	
2091	External Thermostat Application #1 (Floor)	Use (Signal only ON/OFF)	

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Domestic Hot Water & Heat Pump Settings

Menu Code	Function	Default	Site Settings
3011	Domestic Hot water Tank	Use(Hysteresis: Thermo Off)	
302*	3021 -Max Temp.	50.0°C	
	3025 - Max. DHW Operation Time	As per Table 1	
3032	Delay Time	As per Table 1	
304*	3042 - Interval	TUESDAY	
	3043 - Start Time	3HOUR	
	3044 - Target Temp.	55.0°C	
	3045 - Duration	15 Min	
3051	Timer OFF Function	Use Timer Duration:60Min	

Table 1:

#FSV	Tank Volume	Setting
3025 & 3032	≤ 180	50
	200	60
	230	70
	250	75
	300	90
	≥ 400	95

Installer's Signature

Print Name

Heat Pump Installation Checklist

Outdoor Unit Installation

Is the unit installed the correct distance from nearest boundaries?

Is the unit secured correctly to anti-vibration mounts via rubber mounts?

Is the unit mounted plumb level?

Is condensate drain kit fitted? (drain kit located inside HP access door)

If unit is mounted on wall brackets, is drip tray installed?

Heat Pump Plumbing (Outdoor Unit)

Is correct size pipe work used and insulated?

Are flexible anti-vibration hoses fitted and washers used?

Are heat pump isolation valves fitted out at the heat pump?

Is Y-Strainer fitted on the return pipework to heat pump and fitted in the correct orientation?

Is flow and return pipe work connected the right way around?

Cylinder Plumbing (Indoor Unit)

Is Flow and Return pipe work connected the right way around?

Is the heating expansion vessel correctly sized, secured and charged to correct pressure?

Is the Potable expansion vessel secured and charged to the correct pressure?

Are all pump valves and isolating valves fully open?

Has system been completely flushed of air and charged to the correct operating pressure of 1.5 bar?

Are all safety valves and tundish drained through a metal pipe to an appropriate drain point?

Radiator/UFH System

Has all air been removed from emitters?

Have all emitters been balanced correctly?

If UFH is installed, have correct flow rates been set?

If UFH is installed, are all valves on manifolds/pumps fully open?

Heat Pump Wiring (Outdoor Unit)

Is the correct size breaker used for heat pump?

Is an isolation switch installed for the heat pump and mounted on a fixed structure out beside heat pump?

Is the correct size power supply cable used for heat pump?

Are all cable protrusions avoiding condensate tray?

Is the correct communication cable installed and wired into correct terminals?

Cylinder Wiring (Indoor Unit)

Has the correct breaker & power supply cable been selected for the indoor unit?

Is an isolation switch installed for the indoor unit and is it mounted on a fixed structure beside the unit?

Is the correct communication cable installed and wired into correct terminals?

Heating Controls/Stats Wiring

Is each zone/floor corresponding with the correct zone valve?

Are all heating controls powered from controller on cylinder?

Are all heating controls wired and working?

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Introduction

These instructions have been prepared to ensure that the Kodiak Pre-Plumb cylinder, designed and constructed by Joule Group Limited, is installed, operated and maintained efficiently and safely.

This manual provides essential information regarding safe handling, installation, operation, and maintenance of the equipment and should be read in conjunction with the vendor manuals and other information that forms part of the Documentation Pack supplied with this equipment.

Failure to read and follow these instructions could result in personal injury or equipment damage.

Operation of this equipment outside the original design parameters and contrary to the instructions contained in the manual, or following any modification to the equipment without the prior agreement of Joule Group Limited, is forbidden.

No responsibility can be assumed by Joule Group Limited for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the equipment supplied.

Every effort has been made to ensure the accuracy of information contained within this manual.

Please contact Joule Group Limited regarding any errors or omissions along with any questions regarding this manual that require further clarification.

A copy of this manual must always be kept with the equipment throughout its service life for ready consultation.

Should the manual become lost or damaged, please contact Joule Group Limited for a replacement.

Joule Group Limited reserves the right to change this manual without prior notice.

The information contained within this manual is considered to be commercially confidential and must not be reproduced, adapted, translated or released to any third party without prior consent from Joule Group Limited.

Documentation Pack Content

The Documentation Pack, which is supplied in conjunction with this Operations and Maintenance Manual, includes:

- UK Declaration of Conformity
- EU Declaration of Conformity

Safety Information

DANGER	DANGER indicates a hazardous situation that will result in death or severe injury if the hazard situation is not prevented.
WARNING	WARNING indicates a hazardous situation that can result in death or severe injury if the hazardous situation is not prevented.
CAUTION	CAUTION indicates a hazardous situation that can result in minor or moderate injury if the hazard situation is not prevented.
NOTICE	NOTICE is used for practical information outside the context of possible personal injury.
SAFETY INSTRUCTIONS	Safety instructions or similar terms indicate specific safety-related instructions or processes.

WARNING	The cylinder unit must be in an upright position only.
WARNING	All external controls are 230V AC connections.
DANGER	The installer, inspector, commissioning engineer and service engineer must hold a G3 qualification, where applicable, in accordance with the Building Regulations 2010 before carrying out any work.
DANGER	No untrained person shall remove or tamper with any part of the equipment as it may result in death or severe injury.
CAUTION	You can be injured if you do not obey the safety instructions as indicated on warning labels.
CAUTION	Observe all safety instructions and warnings attached to the equipment.
WARNING	Disconnect the mains supply at the isolator prior to carrying out maintenance or repair to the Kodiak Pre-Plumb Cylinder. Turn off the cold-water supply valve, open the hot water tap, open the drain valve. The unit will then drain. Note the draining water may be hot.
WARNING	Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.
WARNING	Do not use this equipment with guards removed or incorrectly fastened.
WARNING	Do not use this equipment with safety devices maladjusted or removed.
NOTICE	It is recommended that the equipment is regularly serviced to ensure that this equipment operates as efficiently and as safely as possible. See Section on “Maintenance” for further details.

CAUTION Prior to starting any maintenance work, ensure the surrounding area is clear of all unnecessary components, debris, trip hazards and people.

CAUTION Use authorised replacement parts only, the use of unauthorised components could cause injury or damage the unit.

CAUTION All safety devices temporarily removed for set up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work prior to operation.

CAUTION The electrical equipment must be inspected and checked at regular intervals. Defects such as loose connections or scorched or otherwise damaged cables must be rectified immediately.

CAUTION Be aware that the unit and any draining water may be hot if maintenance is performed on the unit soon after the unit has been in operation.

CAUTION Leaks from pipework or seals must be repaired prior to use.

CAUTION Take care when coming into contact with pipework as it may be hot.

SAFETY INSTRUCTIONS

This manual provides information regarding the Kodiak Pre-Plumb Cylinder and must be read in conjunction with any other material supplied within the Documentation Pack.

A copy of the Documentation Pack must be available for any persons installing, using, maintaining or repairing this equipment.

Installation and operation must only be undertaken by authorised competent persons (G3 qualification where applicable) who fully understand the information provided within the documentation pack.

The procedures outlined in this operating and maintenance instruction must always be followed.

If in doubt ask, do not take personal risk.

Conditions of Installation

- It is the responsibility to ensure that all the equipment fitted is installed and commissioned in accordance with the O.E.M's instructions and recommendations.
- The manufacturer shall provide the end-user and or installer with the necessary operating, settings, and operating parameters as appropriate for all non -electrical and electrical parts fitted to the equipment.
- The manufacturer shall provide the end-user a copy of the Declaration of Conformity with a copy of the Original Instructions Manual.

Conditions of Safe Use

The following conditions relate to the safe installation and/or use of the equipment.

1. Where applicable the installers, inspector, commissioner, and service engineer must have a G3 qualification in line with the Building Regulations 2010.
2. The installer shall ensure that any discharge from safety devices is safely conveyed to where it is visible but will not cause a danger to persons in or about the building.
3. Where applicable the installers, inspector, commissioner, and service engineer must have a G3 qualification in line with the Building Regulations 2010.
4. Verification that the electrical equipment complies with its technical documentation.
5. Verification of electrical continuity of the protective bonding circuit which shall be measured with a current between at least 0,2 A and approximately 10 A.
6. All pipework should be checked for earth continuity to avoid the formation of a galvanic cell.
7. The functions of electrical equipment shall be tested.
8. The hydraulic system shall be subjected to a combination of inspection and testing to verify that:

- The identification of systems and components conforms to the system's specifications;
- The connection of components in the system complies to the circuit diagram;
- The system, including all safety components, functions correctly;
- There is no unintended leakage on any component other than slight wetting insufficient to form a drop on any cylinder rod after multiple cycles.
- It is the responsibility of the installer to ensure that all equipment fitted is installed and commissioned in accordance with the O.E.M's instructions and recommendations.

Pre-Installation Notes

Store the manual in a safe place in order to be able to use it as reference after installation. For maximum safety installers should always carefully read the following warnings.

Store the provided manual in a safe location with the end user after installation, and remember to hand it over to the new end user if the Heat Pump & Cylinder unit is sold or transferred.

The Air to Water Heat Pump is compliant with the requirements of the Low Voltage Directive (2006/95/EC), the EMC Directive (2004/108/EC) and the pressure equipment directive (97/23/EC).

The manufacturers shall not be responsible for damage originating from unauthorised changes or the improper connection of electric and hydraulic lines.

Do not use units if you see some damages on the units and recognise something untoward such as loud noise, smell or burning.

In order to prevent electric shocks, fires or injuries, always stop the unit, disable the protection switch and contact Joule's technical support if the unit produces smoke, if the power cable is hot or damaged, or if the unit is very noisy.

Always remember to inspect the unit, electric connections, refrigerant tubes and protections regularly. These operations shall be performed by qualified personnel only.

The unit contains moving parts and electrical parts which should always be kept out of the reach of children.

Only authorised personnel may repair, move, alter or reinstall the unit. These operations may cause product damage, electric shock and fires.

Do not place containers with liquids or other objects on the unit.

All the materials used for the manufacture and packaging of the air to water heat pump are recyclable. The packaging material and exhaust batteries of the remote controller (optional) must be disposed of in accordance with local regulations.

The Air to Water Heat Pump containing a refrigerant must be disposed in an authorised centre or returned to retailer as special wastes.

Wear protective gloves to unpack, move, install, and service the unit to avoid your hands being injured by the edge of the parts. Do not touch the internal parts (water pipes, refrigerant pipes, heat exchangers, etc) while running the units. If you need to adjust and touch the units, allow sufficient time for the unit to cool and be sure to wear protective gloves.

In case of refrigerant leakage, try to avoid contact with the refrigerant because this could result in severe wounds.

NO Pre Paid Meters are to be installed on a Samsung Air Source Heat Pump System

General

- All materials supplied in this manual are indispensable for the safety of the equipment. Users shall establish appropriate safety and health practices and determine the applicability of regulatory limitations based on the following descriptions before use.
- This unit contains a high flammable refrigerant, R-290. There are fires and explosions when refrigerant leaks. Be sure to follow the storage, installation, maintenance instructions.(Please refer to the reference guide for details.)
- Always disconnect the air to water heat pump from the power supply before servicing it or accessing its internal components.
- Verify that installation and testing operations are performed by qualified personnel.
- Verify that the air to water heat pump is not installed in an easily accessible area (vandalism/ sabotage/ other harmful activities).
- Carefully read the content of this manual before installing the air to water heat pump and store the manual in a safe place in order to be able to use it as a reference after the installation.
- For maximum safety, installers shall always carefully read the following warnings.
- Store the user and installation manual in a safe location and remember to hand it over to the new owner if the air to water heat pump is sold or transferred of ownership.
- This manual explains how to connect it to the indoor part (hydro unit or control kit). Use of other types of devices with the control system may damage the device and void the warranty.
- The manufacturer shall not be responsible for damages arising from non-compliant units or parts.
- The manufacturer shall not be responsible for damage originating from unauthorised changes or the improper connection of electric and hydraulic lines. Failure to comply with these instructions or to comply with the requirements outlined in the “Operating limits” table included in the manual shall immediately invalidate the warranty.
- To prevent serious system damage and user injuries, precautions and other notices shall be observed.
- Failure to comply with these instructions or to comply with the requirement on the Operating Range (Heat: -25~35 °C/DHW: -25~43 °C/ Cool: 10~46 °C) outlined in the Product Specification shall immediately invalidate the warranty.
- Do not use the units if you see some damages on the units and recognize something problematic such as loud noise or smell of burning.
- To prevent electric shocks, fires or injuries, always stop the unit, ultimately rendering the product powerless. Contact Samsung’s technical support if the unit produces smoke, if the power cable is hot or damaged or if the unit is very noisy.
- Always remember to inspect the unit, electric connections, refrigerant pipework and protections regularly. These operations shall be performed by qualified personnel only.

- Do not attempt to repair, move, alter or reinstall the unit by unauthorised personnel. These operations may cause product damage, electric shocks, and fires.
- Do not place containers with liquids or other objects on the unit. Never sit or stand on the product.
- All the materials used for the manufacturing and packaging of the air to water heat pump are recyclable.
- The packing material and exhausted batteries of the remote controller (optional) must be disposed of in accordance with local regulations.
- Always make sure that the power supply is compliant with local safety standards.
- For use in Europe: This appliance can be used by children aged 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be done by children without supervision.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the appliance use by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.
- Be sure not to perform power cable modification, extension wiring, and multiple wire connection.
  - It may cause electric shock or fire due to poor connection, poor insulation, or current limit exceedance.
- Do not use means to accelerate the defrosting operation or to clean, other than those recommended by Samsung.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- Determine the installation location regarding the conditions cited in this reference guide and obtain the user's approval.
- The outdoor unit must not be placed on its side or upside down, as the compressor lubrication oil will run into the cooling circuit and seriously damage the unit.
- Combine R-290 products only or an error signal appears and the products will not operate. Check with the compatibility table provided by Samsung.
- Make sure to safely dispose of packing materials. Packing materials, such as nails and other metal or wooden pallets may cause injuries to humans and animals by unsafe disposal.

Installing the Unit

NOTICE

When installing the unit, remember to firstly connect the water pipework, then the electrical lines. Always disassemble the electric lines before the water pipework.

- Upon receipt, inspect the product to verify that it has not been damaged during transport. If the product appears damaged, do not install it, as the refrigerant may leak. A leaking product should be moved to a safe outdoor place. There should be no ignition source within 6 meters. Products should be located where the refrigerant can be safely removed or professionally removed and discarded by service technicians. Immediately report the damage to the supplier of the Samsung products (distributor/retailer/ local Samsung branch office)
- After completing the installation, always carry out a functional test (commissioning, including reporting) and provide instructions on how to operate the air to water heat pump to the user.
- Do not use the air to water heat pump in environments with hazardous substances or close to equipment that releases open flames to avoid the occurrence of fires, explosions or injuries.
- While in installation or relocation of the product, do not mix the refrigerant with other gases including air or unspecified refrigerant. Failure to do so may cause pressure increase resulting in an explosion, rupture or injury.
- Do not cut or burn the refrigerant container or pipings.
- Use only suitable and clean service equipment such as the manifold gauge, vacuum pump, and charging hose of the R-290 refrigerant. Make sure that any pump and leakage detection device must be suitable for safely working with R-290 refrigerant.



Failing to do so, may result in fire, explosion, property damage, personal injury or death.

- Installation must be carried out by qualified persons to handle the refrigerant. Additionally, refer to the regulations and laws.
- Be careful not to let foreign substances (lubricating oil, refrigerant other than R-290, water, etc.) enter the refrigerant circuit.
- Products should be installed outdoors with natural ventilation.
- For disposal of the product, follow the local laws and regulations. (Please refer to the reference guide for details.)
- Do not work in a confined or unvented place.
- The work area must be surveyed and inspected prior to any service work, correctly vented and treated always as if the equipment is leaking. The area around the working space must be sectioned off properly.
- The product and the hydraulic system shall be installed in the position where there are no substances that may result in corrosion.

- The following checks shall be performed for installation:
    1. There must be a suitable gas detector to look for refrigerant leaks.
    2. Notify all workers of work contents.
    3. Install "No smoking" and "Do not enter the area" signs.
    4. Receive a work permit from manager and work.
    5. Do not store flammable materials in the workplace.
    6. There should be no sources of ignition anywhere in the workplace.
    7. Appropriate fire extinguishing equipment (CO2 or dry powder type) should be located nearby and conveniently located.
    8. The refrigerant discharged must be sufficiently dispersed and ventilated.
    9. The work area should be appropriately ventilated before working on the refrigerant circuit, brazing, or handling electrics.
- To purge air in the refrigerant piping, be sure to use a vacuum pump suitable for handling R-290.
- Note that the refrigerant has no odour.
- The units are not explosion proof so they must be installed with no risk of explosion.
- For installation with handling the refrigerant (R-290), use dedicated tools and piping materials.
- Servicing and installation shall be performed as recommended by the manufacturer. In case other skilled persons are joined for servicing, it shall be carried out under supervision of the person who is competent in handling flammable refrigerants.
- Safety checks are required to minimize the ignition risk for servicing the units containing flammable refrigerants.
- Servicing shall be performed following the controlled procedure to minimize the risk of flammable refrigerant or gases.
- Do not install the unit where there is a risk of combustible gas leakage.
- Do not place the unit near heat sources.
- Be cautious not to generate a spark as follows:

– Do not remove the fuses with power on.

- If the indoor unit is not R-290 compatible, an error signal appears and the unit will not operate.
- After installation, check for leakage. Toxic gas may be generated if it comes into contact with an ignition source such as the fan heater, stove, and cooker.
- In order to service the product, collect the refrigerant in vacuumed recovery cylinders.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.

Caution of Ignition Sources

- Appropriate fire extinguishing equipment should always be available during any type of hot work.
- A dry powder or CO_2 fire extinguisher must be available near the charging area. Please comply with local rules and regulations regarding working with open flames. Always respect waiting times and requirements regarding the type and quantity of the extinguishing equipment.
- Make sure to store the units in a place without continuously operating ignition sources (for example, open flames, an operating gas appliance or an operating electric heater).
- The service engineers shall not use any ignition sources with the risk of fire or explosion.
- Potential ignition sources shall be kept away from the work area where the flammable refrigerant can possibly be released to the surrounding.
- The work area should be checked to ensure that there are no flammable hazards or ignition risks. The "No smoking" sign shall be attached.
- Under no circumstances shall potential sources of ignition be used during leak detection.
- Make sure that the seals or sealing materials have not degraded.
- Safe parts are the ones with which the worker can work in a flammable atmosphere. Other parts may result in ignition due to leakage.
- Replace components only with parts specified by Samsung. Other parts may result in the ignition of refrigerant in the atmosphere from a leak. In the case of electric components replacement, care should be taken to ensure that electrical terminals, including capacitor terminals, are adequately tightened and secured against loosening and that adequate insulation is provided to avoid live parts shorting together.
- Make sure that the work area is well ventilated before performing hot work.
- Ventilation of the installation areas must be maintained during the work.
- The ventilation should safely disperse any released gases and preferably expel them into the atmosphere.

Leakage detection and refrigerant recovery

- The leakage detector shall be calibrated in a refrigerant-free area.
- Make sure that the detector is not a potential source of ignition.
- Leak detector shall be set at percentage of LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of the of gas (25% maximum) is confirmed.
- The use of detergents containing chlorine shall be avoided for cleaning because the chlorine may react with the refrigerant and corrode the pipings.
- If leakage is suspected, open flames must be extinguished immediately.
- If a leakage is found during brazing, the entire refrigerant shall be recovered from the product or isolated (e.g. using shut-off valves). It shall not be directly released to the environment. Oxygen free nitrogen (OFN) shall be used for purging the system before and during the brazing process.
- The work area shall be checked with an appropriate refrigerant detector before and during work.
- Ensure that the leakage detector is appropriate for use with flammable refrigerants.

Labelling

- The parts shall be labelled to ensure that they have been decommissioned and emptied of refrigerant.
- The labels shall be dated.
- Make sure that the labels are affixed on the system to notify it contains flammable refrigerant.

Refrigerant recovery

- Empty recovery cylinders shall be evacuated and cooled before recovery.
- When removing refrigerant from the system for servicing or decommissioning, it is recommended to remove the entire refrigerant.
- When transferring refrigerant into cylinders, make sure that only the refrigerant recovery cylinders are used.
- All cylinders used for the recovered refrigerant shall be labelled.
- Cylinders shall be equipped with pressure relief valves and shut-off valves in a proper order.
- The recovery system shall operate normally according to the specified instructions and shall be suitable for refrigerant recovery.
- In addition, the calibration scales shall operate normally.
- Hoses shall be equipped with leak-free disconnect couplings.
- Before starting the recovery, check for the status of the recovery system and sealing state. Consult with the manufacturer if a fault is suspected.

- The recovered refrigerant shall be returned to the supplier in the correct recovery cylinders with the Waste transfer note attached.
- Do not mix refrigerants in the recovery units or cylinders.
- If compressors or compressor oils are to be removed, make sure that they have been evacuated to the acceptable level to ensure that flammable refrigerant does not remain in the lubricant.
- The evacuation process shall be performed before sending the compressor to the suppliers.
- Only the electrical heating to the compressor body is allowed to accelerate the process.
- Oil shall be drained safely from the system.

Installation Location Requirement of Outdoor Unit

- The product must be installed outdoors.
- Be sure to observe the suggested Safety Zone. (Page 24)
- Wear protective gloves to unpack, move, install, and service the unit to avoid your hands being injured by the edge of the parts.
- Do not touch the internal parts (water pipes, refrigerant pipes, heat exchangers, etc.) while running the units. And if you need to adjust and touch the units, please observe enough time for the unit to cool down and wear protective gloves.
- Our units shall be installed in compliance with the spaces described in the installation manual, to ensure accessibility from both sides and allow repairs or maintenance operations to be carried out. If the units are installed without complying with procedures described in the manual, additional expenses can be asked because special harnesses, ladders, scaffolding, or any other elevation system for repair service will not be considered part of the warranty and will be charged to the end customer.
- Make sure that (thaw) water runs correctly and unhindered out of the unit at low ambient temperature. If the drainage is exposed to subzero temperatures, additional protection must be taken by the installer, such as installing heater cables in the drain piping. Failing to do so, may cause severe damage to the product and potential leakages of refrigerant into the environment.
- Install the power cable and communication cable of the indoor and outdoor unit at least 1m away from other electric appliances.
- Protect the unit from rats or small animals. If an animal makes contact with the electric parts, it can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.
- Do not disassemble and alter the heater at your own discretion.
- Wear protective equipment (such as safety gloves, goggles, and headgear) during installation and maintenance works.
- Installation and repair technicians may be injured if they do not wear appropriate protective equipment.
- To prevent ignition, never install motor-driven equipment close to the unit.
- The applicable local, National, and European regulations shall be observed.

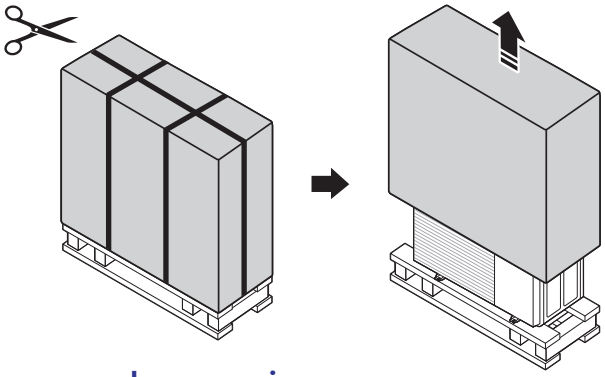
Handling the Box

This chapter describes what needs to be done after the boxes with the outdoor and indoor units are delivered on-site.

NOTICE

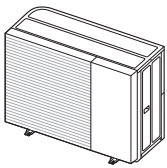
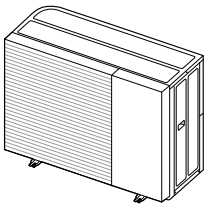
- Directly after delivery, the unit must be checked for (transport) damage. Any damage must be reported immediately to the applicable distributor of the Samsung products. After inspection, the protective wrapping and box must be put back correctly in order to protect the product.
- It is important to protect the product, therefore transport the product in the protective packaging and keep covered until final installation.
- Preparation of both horizontal and vertical transport (routes and equipment) might be required in order to get the product in the correct installation location.

Unpacking the outdoor unit



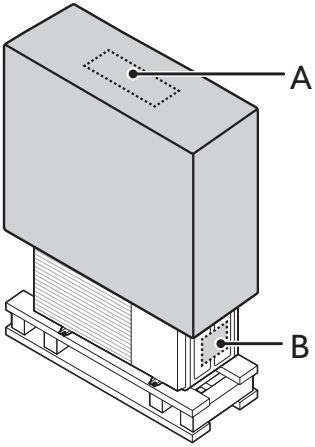
Product line-up and accessories

Product line-up

Outdoor unit		
Chassis		
Model name	AE050CXYDEK AE080CXYDEK	AE120CXYDEK AE160CXYDEK

Accessories

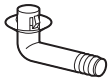
- Keep supplied accessories until the installation is finished.
- Hand the installation manual over to the customer after finishing installation.

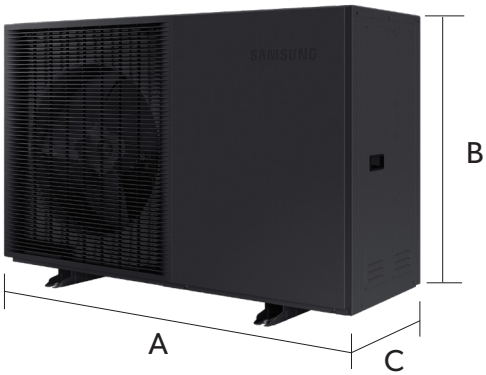


Accessories in area A

Installation manual (1)	Instruction manual (1)
	

Accessories in area B

Drain plug (1)	Rubber leg (4)
	
Drain cap (1)	
	



Product Code	A (mm)	B (mm)	C (mm)
AE050CXYDEK	998	850	500
AE080CXYDEK	998	850	500
AE120CXYDEK	1270	1018	530
AE160CXYDEK	1270	1018	530

Unit Installation

Preparing the installation of the outdoor unit

Choose a sufficient space for carrying the unit to the installation location in advance. Do not choose a location where a lot of dust is created such as a construction work site.

CAUTION!

- The refrigerant inside the unit is A3- highly flammable (R-290).
- Do not install where there is a risk of combustible gas leakage or heat sources.
- To handle, purge, and dispose the refrigerant, or break into the refrigerant circuit, the worker should have a certificate from an industry-accredited authority in order to be compliant with regulations.
- Verify that the air to water heat pump is not installed in an easily accessible area (vandalism/ sabotage/ other harmful activities).

Choosing the installation location

NOTICE

- Read the precautions and requirements in the part "General safety information".
- The outdoor unit is designed for outdoor installation only, and for the following ambient temperatures:
  - Space heating mode -25~35 °C
  - Domestic hot water mode -25~43 °C
  - Space cooling mode 10~46 °C

Decide the installation location regarding the following condition and obtain the user's approval.

- Choose a location that is dry and sunny, but not exposed to direct sunlight or strong winds.
- Do not block any passageways or thoroughfares.
- Choose a location where the noise of the air to water heat pump when running and the discharged air does not disturb any neighbours.
- Choose a position that enables the pipes and cables to be easily connected to the other hydraulic system.
- Install the outdoor unit on a flat, stable surface that can support its weight and does not generate any unnecessary noise and vibration.
- Position the outdoor unit so that the air flows directly towards the open area.
- Place the outdoor unit where there are no plants and animals because they may cause malfunction of outdoor unit.

- Maintain sufficient clearance around the outdoor unit, especially from a radio, computer, and stereo system.
- The outdoor unit shall be installed in an open space that is always ventilated.
- Observe the suggested safety zone.

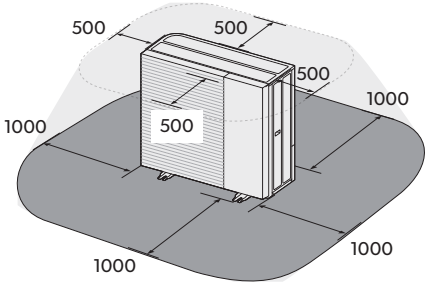
Do not install the air to water Heat Pump in the following locations:

- A location where there are any potential dangerous substances like: combustible gas, carbon fiber, mineral oil, arsenic acid, flammable dust, thinner or gasoline, etc.
- A location where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet. The copper pipe or connection pipe may corrode and refrigerant may leak.
- A location where the outdoor unit can easily overheat by solar radiation or if the ambient temperature exceeds 35°C during cooling mode. A larger installation space is required for protection against direct solar radiation.
- A location where strong winds may affect the unit. Please also consider enough clearance to avoid issues with the exhaust air from the unit if directed at people.
- A location where air is trapped and may short circuit over the unit. Or where not enough service space is available.
- A too narrow location, as it can lead to problems and potential damage to the product. Also it can lead to the injuries during installation or service work.
- A location where not enough ventilation space exists, especially when installing multiple outdoor units. Obstacles may disturb the airflow over the unit and can potentially cause short circuiting between exhaust air and inlet air and may lead to malfunction.

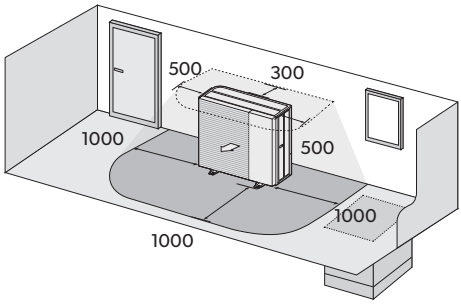
Safety Zone

CAUTION!

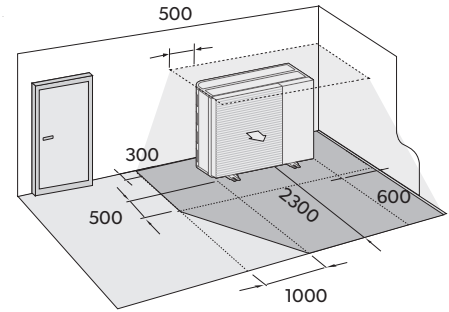
- In case of a leakage the refrigerant must not be able to enter the indoor under any circumstances. The Safety Zone shall not have any building openings such as: Windows, Doors, Light wells, Flat roof windows, Air Inlet /Outlet of ventilation systems, drains etc.
- R-290 refrigerant is heavier than air and can be collected on the ground. There should be no sinking or deepening of the ground in the safety zone.
- The safety zone should not extend to intact buildings or public spaces.
- The safety zone cannot be modified later to violate the protection rules.
- Isolation switches must not be installed within the safety zones



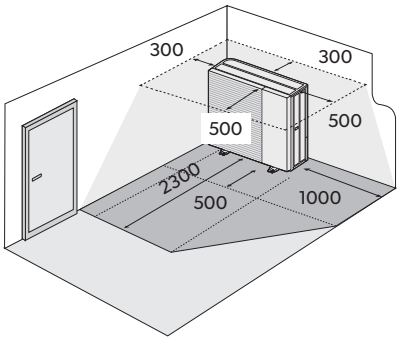
- When installed on the ground
- When installed in a place with a flat roof



- When installed on the ground in front of a building wall

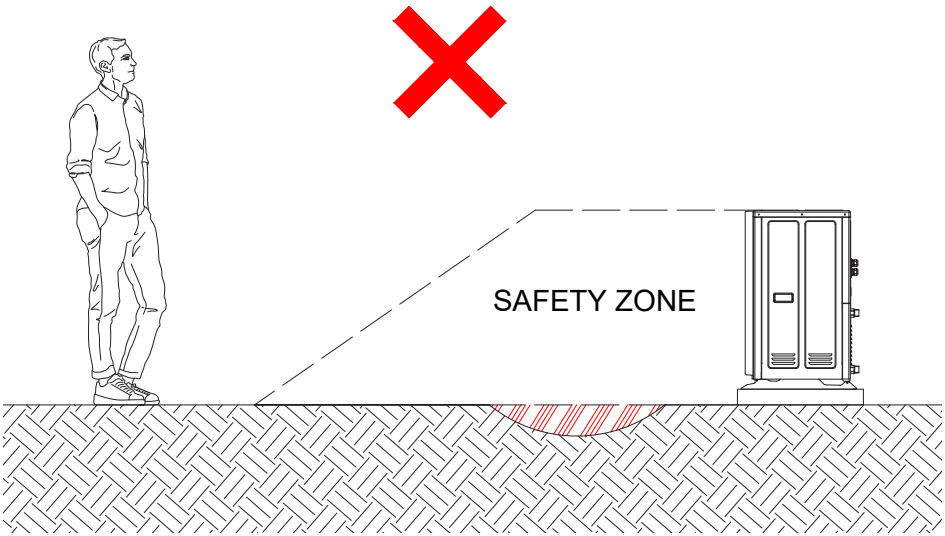


- When installed at the right corner of a building

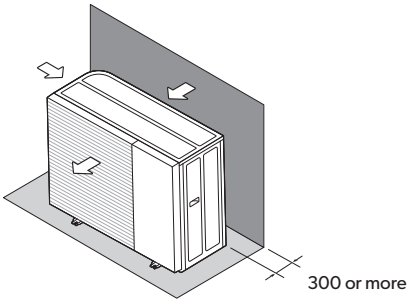


- When installed at the Left corner of a building

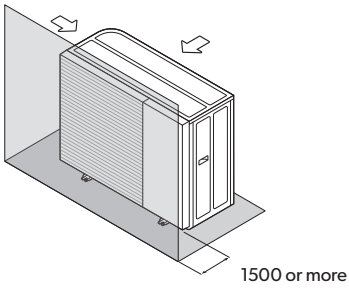
R290 units can be installed on balconies provided all safety clearances are adhered to.



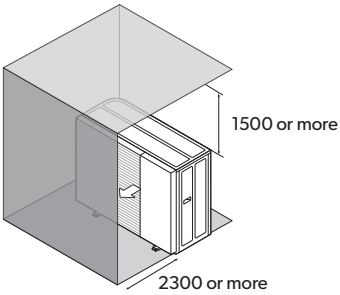
When installing 1 outdoor unit



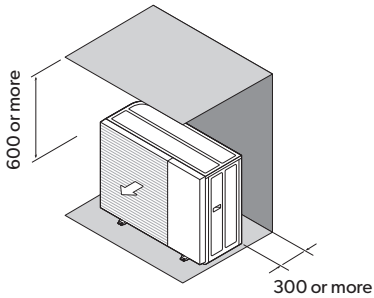
- Wall on suction-side



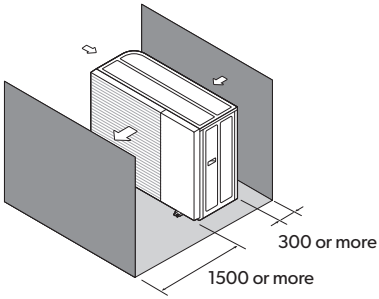
- When the air outlet is towards the wall



- Top-side obstacle
- Discharge-side obstacle
- Wall on discharge-side

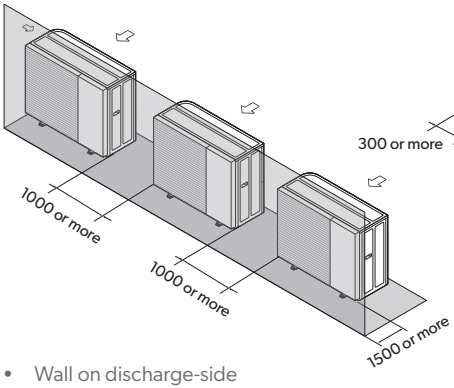


- Top-side obstacle
- Wall on suction-side

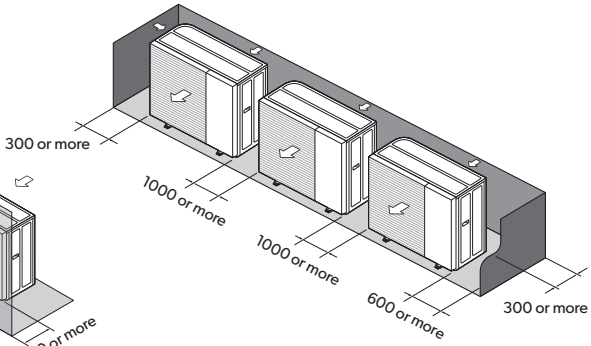


- Suction-side obstacle
- Wall on discharge-side

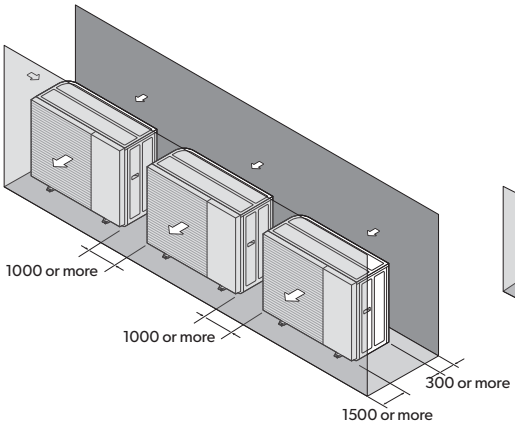
When installing more than 1 outdoor unit



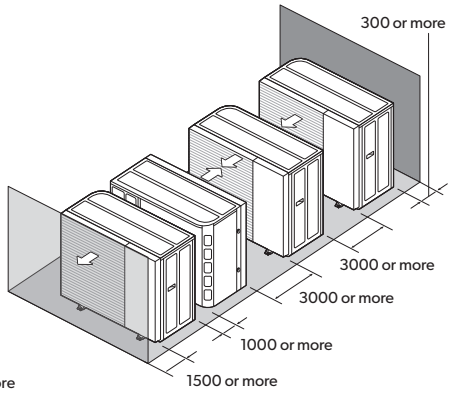
- Wall on discharge-side



- Suction-side obstacle (3 sides)
- No top-side obstacle



- Wall on suction-side
- Wall on discharge-side



- Wall on suction-side
- Wall on discharge-side

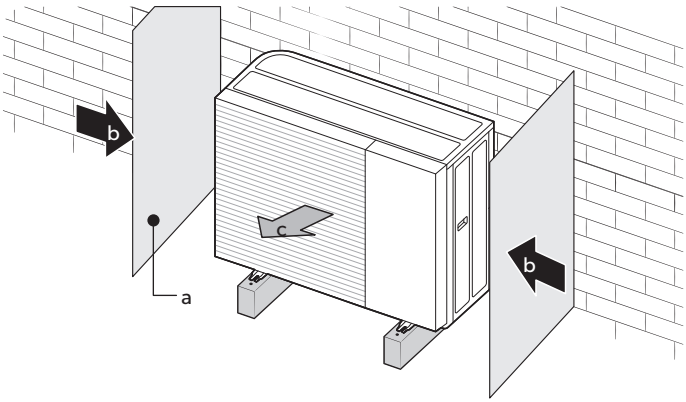
CAUTION!

- The units must be installed according to distances declared, in order to permit accessibility from each side, to guarantee correct operation of maintenance or repairing of the products. The unit's parts must be accessible and serviceable under safe working conditions (for people or things).

Installing the unit at a location with strong winds:

- Outdoor unit must be fixed firmly so that it can withstand the wind speed of the strong wind. If you cannot fix the outdoor unit on the base ground, fixate it sideways or use an extra support structure.
- To prevent exposure to (strong) wind, install a baffle plate on the air discharge side of the unit. (If there is a strong wind facing the outdoor air outlet, it causes a short circuit. This can lead to performance degradation, broken fan (motor), and acceleration of frost.)
- Install a wind protection shielding with anticipation of the dominant wind direction. If the direction of the air discharge part is pointing to the dominant direction of the wind, it could cause performance decrease and potential damage to the product.

a. Baffle plate
b. Prevailing wind direction
c. Air outlet

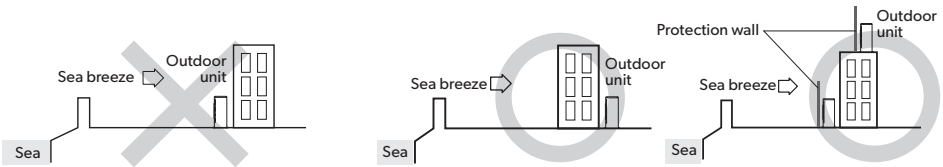


Installation guide at the seashore

Make sure to follow the below guides when installing at the seashore.

1 Do not install the product in a place where it is directly exposed to sea water and sea breeze.

- Make sure to install the product behind a structure (such as a building) that can block sea breeze.



- A protection wall should be constructed with a solid material that can block the sea breeze and the height and width of the wall should be 1.5 times larger than the size of the outdoor unit. (Please secure more than 700 mm of space between the protection wall and the outdoor unit for air circulation.)

2. Consider that the salt particles clinging to the external panels

- When a product is installed at the seashore, periodically clean it with fresh water to remove attached salt deposits.

3. Make sure that the base of the unit is installed at water level and therefore has optimum drainage. Because trapped water at the bottom of the outdoor unit significantly promotes corrosion.

- Prevent blockage of the drain hole by foreign substances, by cleaning adequately.
- Make sure to clean the base plate adequately and regularly as dirt, sand and other substances stay moist and promote corrosion.

4. If the product is installed within 500 m of a seashore, special anti-corrosion treatment (like special coating) is required.

- Please contact your local Joule for further details.

5. When the product is installed at a seashore, periodically clean it with water to remove attached salinity.

6. If the (protective) coating or galvanised steel of the product is damaged during the installation or maintenance, make sure to repair it.

7. Check the condition of the product periodically.

- Check the installation site every 3 months and perform anti-corrosion treatment.

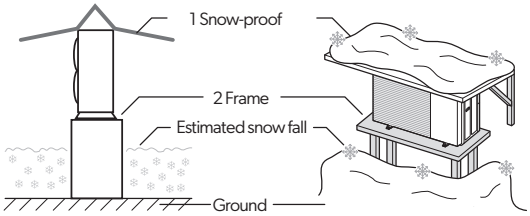
When installing more than 1 outdoor unit

NOTICE

- When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

In heavy snowfall areas it is very important to select an installation location where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow. (If necessary construct a lateral canopy).

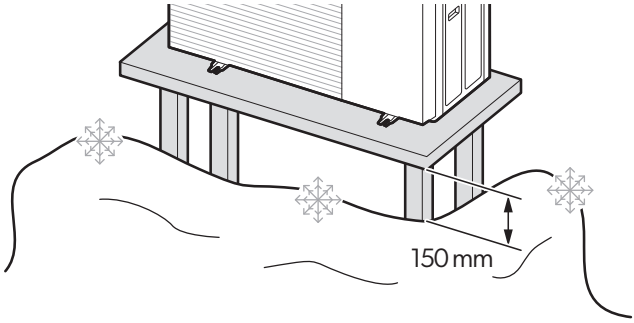
1. Construct a large canopy.
2. Construct a pedestal.
   - Install the unit high enough off the ground to prevent it from being buried under snow.



Heavy snow fall area

If the product is installed in a region of heavy snow, allow enough distance between the product and the ground (or piled up snow).

- In areas with heavy snow fall, piled snow could block the air intake. To avoid this, install a frame that is higher than estimated snow fall. In addition, install a snow-proof hood to avoid snow from piling on the outdoor unit.
- If ice accumulates on the base, it may cause critical damage to the product. (e.g., a lakeside in a cold area, the seashore, an alpine region, etc.)
- In a heavy snowfall area, do not install the drain plug and drain cap in the outdoor unit. And, it may cause frozen ground. Therefore, take appropriate measures to prevent it.
- Make a space more than 150 mm between the bottom of the outdoor unit and the ground for installation.
- Make sure that the product is located at least 150 mm above the maximum expected level of snow.

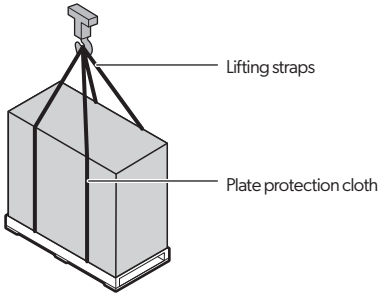


Moving the outdoor unit

- Be sure that the moving route is safe by anticipating the weight of the outdoor unit in advance.
- Do not slant the product more than 30˚when carrying it. (always keeping the unit upright)
- The surface of the heat exchanger is sharp. Be careful not to be injured while moving and installing by wearing your personal protective equipment (gloves, etc.).

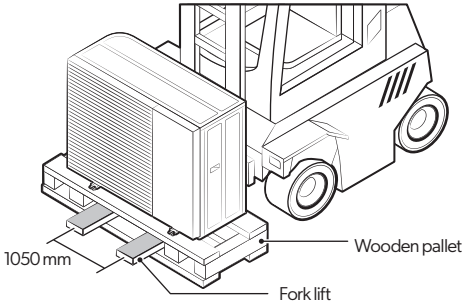
Moving the outdoor unit by hoisting

- Only hoist the product with using approved lifting straps (according to local regulations). Keep long straps to avoid damage to the panels. Always wear personal protective equipment (safety helmet) when hoisting.



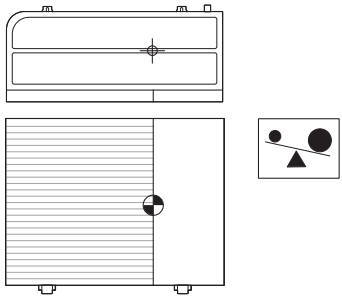
Moving the outdoor unit with a forklift

- Insert the fork into the wooden pallet at the bottom of the outdoor unit carefully. Be careful that the fork does not damage the outdoor unit. Operating a forklift may require special certification or training according to local regulations.



NOTICE

- When looking at the product from the front, there is a centre of gravity right from the middle of the product. Refer to the centre of gravity mark attached to the product.



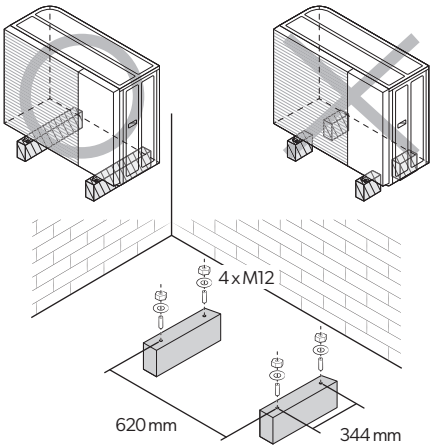
Moving the outdoor unit

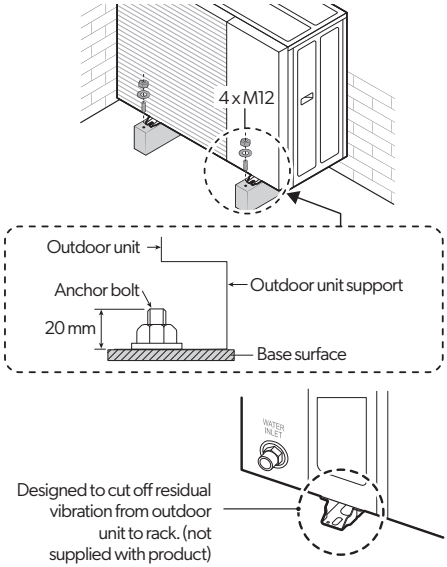
The outdoor unit must be installed on a rigid and stable base to avoid any increase in the noise level and vibration, particularly if the outdoor unit is to be installed in a location exposed to strong winds or at a height, the unit must be fixed to an appropriate support (wall or ground).

CAUTION!

- When tightening the anchor bolt, tighten the rubber washer to prevent the outdoor unit bolt connection part from corroding.
- Make a drain outlet around the base for outdoor unit drainage.
- Due to safety zone requirements the unit cannot be sat above an open drain or gully as this could be a location R290 could accumulate in the event of a leak.
- The unit may be positioned above a permeable strata such as a pea gravel soak away that is level with the surrounding base, this would satisfy the safety zone requirements, or the condensate can be to be routed to a drain via a waste pipe, the drain pipe should be lagged to prevent issues with freezing.
- If the outdoor unit is installed on the roof, you have to check the ceiling strength and waterproof the unit.
- The anchor bolt must be 20 mm or higher from the base surface.

※ In order to prevent freezing of water drains, additional protection such as application of a heating cable may be required.





Outdoor unit drain work

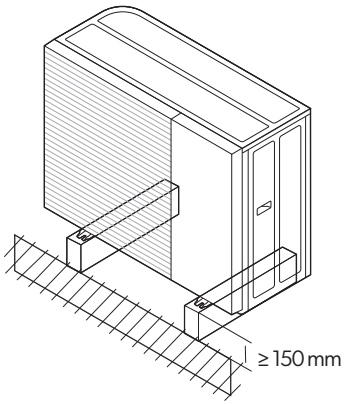
General area

While the air to water heat pump is operating in heating mode, ice can accumulate on the surface of the condenser. To prevent ice from growing, the system occasionally enters a defrost mode and the ice on the surface thaws off. Water dripping from the condenser is guided through the drain holes to prevent ice formation inside the base plate at subzero temperatures.

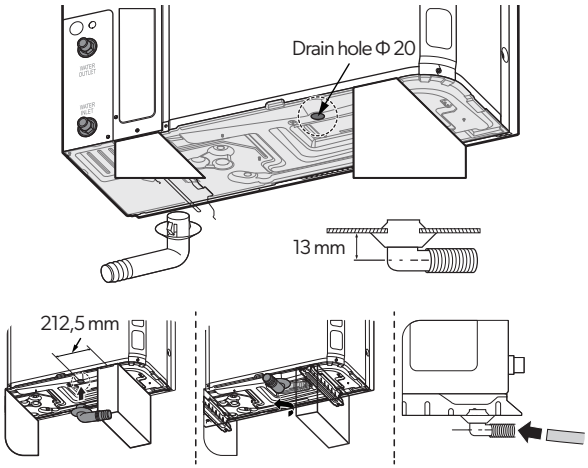
- In case there is not enough space for natural drainage from the outdoor unit, additional drain work is required.

  Follow the description as per below:

  - Provide a minimum of 150 mm of free space to the floor.
  - Insert the drain plug into the hole at the bottom of the outdoor unit.
  - Connect the drain hose to the drain plug.
  - Make sure dirt and debris cannot block the drain (hose). Clean the base plate whenever needed.
  - For the remaining holes (that do not have the drain plug), insert the drain cap
  - Make sure that the water dripping from the drain hose runs away correctly and safely.

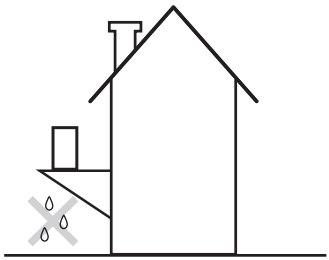


If the drainage is not adequate, it can lead to stagnant water and ice build-up, causing system performance issues and possible damages.



1. Prepare a water drainage channel around the foundation, to drain waste water from around the unit.

2. If the water drainage from the unit is inadequate, please raise the unit on construction concrete blocks, etc. (the height of the construction should be at least 150 mm).



3. If you install the unit on a frame, please install a slanted waterproof plate within 150 mm of the underside of the unit to prevent water from splashing against the bottom plate from below.

4. When installing the unit in a place frequently exposed to snow, pay special attention to elevating the foundation as high as the average snow height plus the additional required 150 mm.

5. If you install the unit on a wall support bracket, please install drainage pipework. In order to avoid the drain water from dripping on the floor potentially creating a slippery surface or an ice layer under freezing conditions.

※ Please securely mount the outdoor unit before connecting the water piping.

Piping Installation

About the piping work

Water connections must be made in accordance with the Water Piping and Wiring diagram delivered with the unit, respecting the water inlet and outlet. If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:.

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs. Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for the sealing of the connections.
- The sealing must be able to withstand the pressures and temperatures of the system. When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes.

⚠ CAUTION!

- Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.
- Always use two wrenches (spanners) for tightening or loosening the water connections, and tighten connections with a torque wrench as specified in the below table. If not, connections and parts can be damaged and leak.
- The unit is only to be used in a closed water system. If applications are in open water circuit, it will generate heat exchangers fouling, corrosion, and leak.

Name	Tightening torque	
BSPP1	350~380 kgf•cm	34~37 N•m

Connecting the water pipes

Connecting the water piping typically follows the below procedure:

1. Connect the water piping to the outdoor unit.
2. Connect the water piping to the indoor unit.
3. Connect the recirculation piping.
4. Connect the drain hose to the drain.
5. Fill the water circuit.
6. Fill the DHW tank.
7. Insulate the water piping.

Water Charging

Fill water into the outdoor unit by opening the shut-off and drain valves.

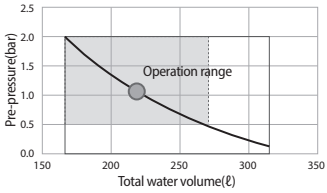
CAUTION!

- The operating range of leaving water temperature is 15~75˚C at heating conditions and 5~25˚C at cooling conditions.
- The minimum required water flow for operation is 7 litres/min. At all times the required water flow-rates should remain. Otherwise, the unit can stop due to a lack of water.
- Water quality must be according to EN directive 98/83 EC. (Please refer to the reference guide for details.)
- Charge the water higher than pressure of 1.0 bar by using make-up water assembly(Field supply). (The water pressure indicated on the manometer will vary depending on the water temperature) The nominal water pressure in the system should remain about 1.5 bar at all times to avoid air entering the water system.

Setting capacity and pre-pressure of the expansion vessel

When it is required to change the default precharge pressure of the expansion vessel(1 bar), keep in mind the following guidelines:

- Use only dry nitrogen or air to set the expansion vessel pressure.
- Inappropriate setting of the expansion vessel precharge pressure will lead to malfunction of the system.
- Therefore, the pressure should only be adjusted by a competent installer.



Installation height difference(a)	Water volume	
	< 220 Litres	> 220 Litres
<7m	No precharge pressure adjustment required.	Actions required: • Pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.
>7m	Actions required: • Precharge pressure must be increased, calculate the appropriate value following by "Calculating the precharge pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference(m) between the highest point of the water circuit and the indoor unit. If the unit is located at the highest point of the installation, the installation height is considered 0m.

- When Expansion vessel has a capacity 8 litres and 1bar pre-charged. Water volume of total system for reliable performance is minimum 30 litres.

Calculating the pre-charge pressure of the expansion vessel

The pre-pressure(Pg) to be set depends on the maximum installation height difference(H) and is calculated as below :

Pg=(H/10+0.3) bar

Pipe work system volume

Primary Pipework Volume (L)																				
Flow & Return Length (m)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
28mm Qualpex	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
28mm Polypipe	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
26mm Alupex	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	13
32mm Alupex	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17	18	19	20	21
40mm Alupex	2	3	5	7	9	10	12	14	15	17	19	21	22	24	26	27	29	31	33	34
22mm Copper	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	12	13
28mm Copper	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	18	19	20	21	22
32mm Copper	1	3	4	6	7	8	10	11	13	14	16	17	18	20	21	23	24	25	27	28

1L Volume of water in Heat Pump Heat Exchanger

It is required to achieve a minimum primary water volume of 30L for the AE050CXYDEK/EU and AE080RXYDEG units and 50L for the AE120CXYDEK/EU and AE160CXYDEK/EU units. Note it is the responsibility of installer to determine if additional water volume is required. System water volume is dependant on the type and length of pipework used. See above table to estimate pipework water volumes.

Pressure relief valve

The outdoor unit does not have a pressure relief valve incorporated. The installer MUST ensure the system is protected from over-pressurisation. The valve shall prevents abnomal water pressure from damaging the system by opening at a maximum pressure setting of 3.0 bar.

Filter / Strainer

Installation of the filter/ strainer is essential to protect the outdoor unit from system debris.

The filter/ strainer must be cleaned regularly to maintain the minimum system flow rate.

Piping insulation

Pipe or duct insulation should comply with BS 5422:2009. Alternatively, insulation of a thickness that provides reduction of heat loss equivalent to material having a thermal conductivity of 0.035 W/mK at 40 °C and thickness equal to the diameter of the pipe (or 40mm, whichever is smaller) may be used.

Protection of the water circuit freezing

To prevent the hydraulic components from freezing, it has a freezing protection function that includes activation of the pump at low temperatures. However, in case of a power failure, these functions cannot guarantee protection. To protect the water circuit from freezing, any one of the following acts shall be performed.

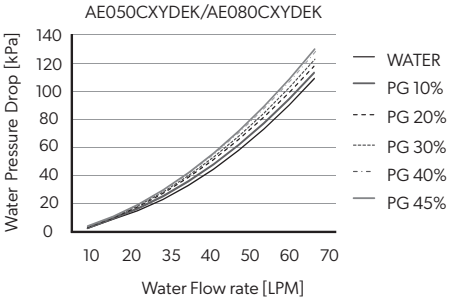
- Add glycol to water. Glycol lowers the freezing point of water.
- Install the anti-freeze valve. The anti-freeze valve discharges water from the system before it freezes.

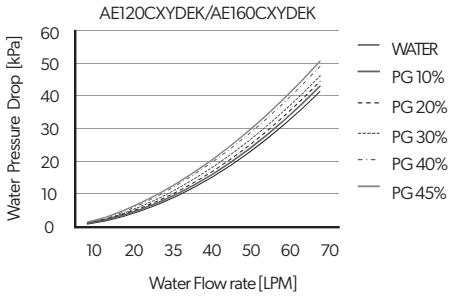
CAUTION!

- Due to the presence of glycol, corrosion of the system is possible. Uninhibited glycol will turn acidic under the influence of oxygen. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.
- A glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols.
- No automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates which can foul or plug the system.
- Galvanized pipes are NOT used in glycol systems since the presence may lead to the precipitation of certain components in the glycol's corrosion inhibitor.

Unit resistance and PHE resistance by glycol concentrate

The unit is composed of water pipes and PHE basically. To ensure correct operation and predict the expected performance, Flow and Resistance table can be used and Flow and resistance characteristic is dependent on Glycol concentration.





Changing Glycol concentration can cause the pressure drop of the system and it can lead to make flow rate slow. Just in case of performance degradation, installer shall be careful of flow rate changes.

The required concentration of glycol depends on the lowest expected outdoor temperature, and on whether you want to protect the system from bursting or from freezing. To prevent the system from freezing, more glycol is required. Add glycol according to the table below.

Freezing Points of Ethylene Glycol - Water Mixtures		
Percent Ethylene Glycol [wt.%]	Freezing Point [°F]	Freezing Point [°C]
0	32	0
10	26	-3
20	20	-7
30	10	-12
36	0	-18
40	-5	-20
43	-10	-23
48	-20	-29

Outdoor water piping insulation

The complete water circuit, inclusive all the piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 9 mm with λ=0.035 W/mK in order to prevent freezing on the outside water piping.

If the temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 20 mm in order to avoid condensation on the surface of the sealing.

For piping in free air, it is recommended to use the insulation thickness as shown in the below table as a minimum.

(with λ=0.035 W/mK).

Piping length (m)	Minimum insulation thickness (mm)
< 20	19
20 ~ 30	32
30 ~ 40	40
40 ~ 50	50

NOTICE

- This recommendation ensures good operation of the unit, however, local regulations may differ and shall be followed.

Electrical Installation

Precautions when connecting the electrical wiring

WARNING!

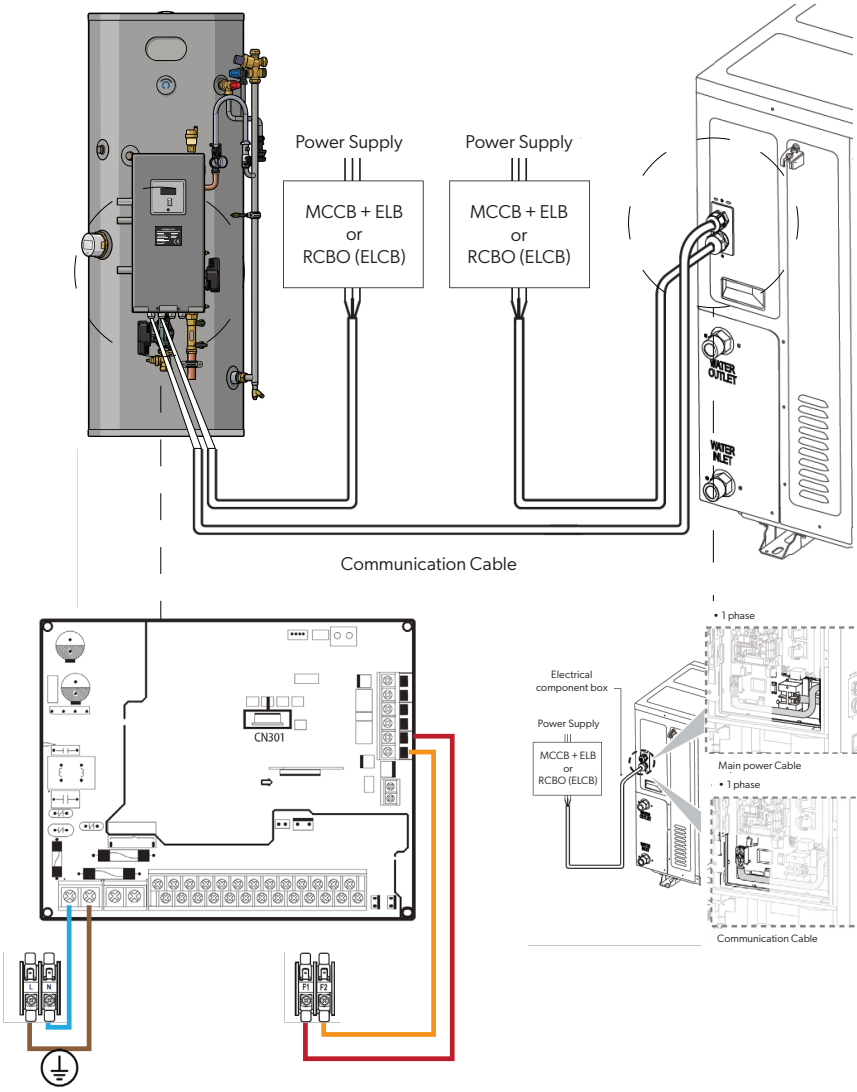
- Make sure first the water piping is connected before the electrical wiring work.
- When removing or relocating the equipment, power off first and then disconnect the electrical wiring.
- Connect the air to water heat pump to a protected earth (PE) before connecting the phase and neutral to the product.
- Follow the local installation standards and regulations when installing electrical wiring. Electrical wiring should be installed by a certified electrician or certified installer. Failing to comply, might lead to damaging the product, starting a fire and personal injury, electrocution or death.

- Make sure that wiring work must be done by an authorised electrician.
- The wiring materials and wiring work must comply with the applicable legislation.
- Always verify that a suitable grounding connection is available.
- Verify that the voltage and frequency of the power supply comply with the specifications and that the installed power is sufficient to ensure the operation of any other domestic appliance connected to the same electric lines.
- Always verify that the cut-off and protection switches are suitably dimensioned.
- Verify that the air to water heat pump is connected to the power supply in accordance with the instructions provided in the wiring diagram included in the manual.
- Always verify that electric connections (cable entry, the section of leads, protections...) comply with the electric specifications, local regulations and installation standards and with the instructions provided in the wiring scheme. Always verify that all connections comply with the standards applicable to the installation of air to water heat pumps.
- Depending on the condition of power supply, unstable power or voltage may cause malfunction of the parts or control system. (Avoid using power supply from an electric generator, like on a ship etc).

CAUTION!

- Make sure that you earth the cables.
  - » Do not connect the earth wire to the gas pipe, water pipe, lightning rod or telephone wire. If earthing is not complete, electric shock or fire may occur.
- Install the circuit breaker.
  - » Failing to install a circuit breaking device may result in electric shock and fire occurrence.

- Install the power cable and communication cable of the indoor and outdoor unit according to IEC 60364-1 (Electrical installations and protection against electric shock).
- Be sure to install both an earth leakage detector and circuit breaker with specified capacity in accordance with relevant local and national regulations.
  - » If it is not installed properly, it may cause electric shocks and fire.



Specification of power cable

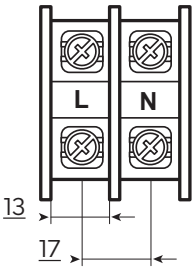
- **1 Phase**
  - » The power cables are not supplied with the air to water heat pump.
  - » Power supply cords of parts of appliances for outdoor use shall not be thinner than polychloroprene sheathed flexible cord (Code designation IEC:60245 IEC 57 / CENELEC:H05RN-F)
  - » This equipment complies with IEC 61000-3-12.

Outdoor unit	Rated		Voltage Range		MCA	MFA
	Hz	Volts	Min	Max	Min Circuit Amps.	Max Fuse Amps.
AE050CXYDEK	50	220-240	198	264	16.1	17.6
AE080CXYDEK	50	220-240	198	264	26	28.6
AE120CXYDEK	50	220-240	198	264	32	35.2
AE160CXYDEK	50	220-240	198	264	32	35.2

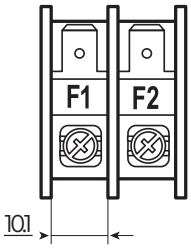
Terminal block specification

- **1 Phase**

AC power: M5 screw

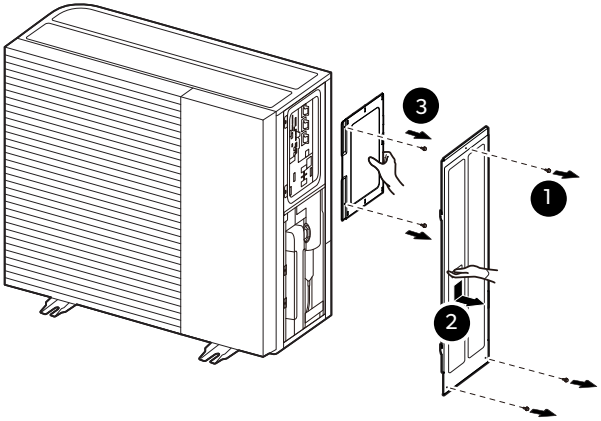


Communication: M4 screw

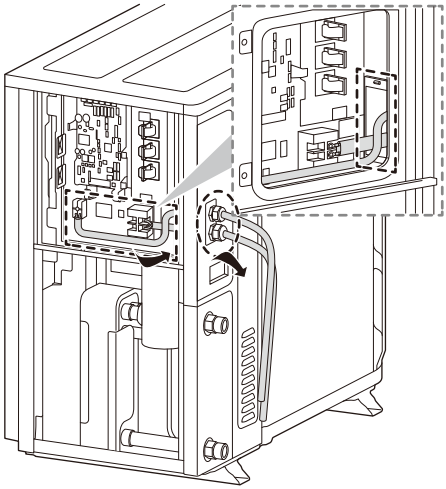


Terminal block specification

1. Open the switch side cover.



2. Insert the cables at the rear of the unit, and route them through the factory mounted cable sleeves into the switch box.



Power and communication cable configuration

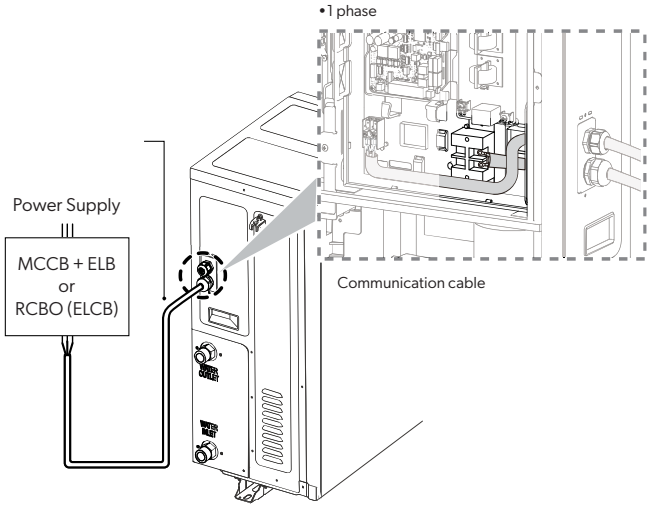
- Power supply cable must be guided through the knock-out hole on the bottom-right or right side of the cabinet.
- Guide the communication cable through the designated knockout hole on the bottom-right side of the front part.
- Install the power and communication cable using a separate cable protection tubing.
- Fix the conduit to the knock-out hole on the outdoor unit by using a conduit bushing and nut.
- Two cables must be connected to the outdoor unit.
  - » The communication cable between the indoor and outdoor unit.
  - » The power cable between the outdoor unit and the auxiliary breaker.
- Especially for the Russian and European market, before installation, the supply authority should be consulted to determine the supply system impedance to ensure compliance.

CAUTION!

- You should connect the power cable into the power cable terminal and fasten it with a clamp.
- The unbalanced power must be maintained within 2% of the supply rating.
  - » If the power is unbalanced greatly, it may shorten the life of the electrical components. If the unbalanced power is exceeding 4% of the supply rating, the control kit is protected, stopped and an error code is displayed.
- To protect the product from water and possible shock, keep the power cable and the connection cord of the control kit and outdoor units within ducts (with appropriate IP rating and material selection for your application).
- Ensure that the main supply connection is made through a disconnection switch within your arm's reach, that disconnects all poles, with contact gap of a least 3 mm.

Route the cable through the frame

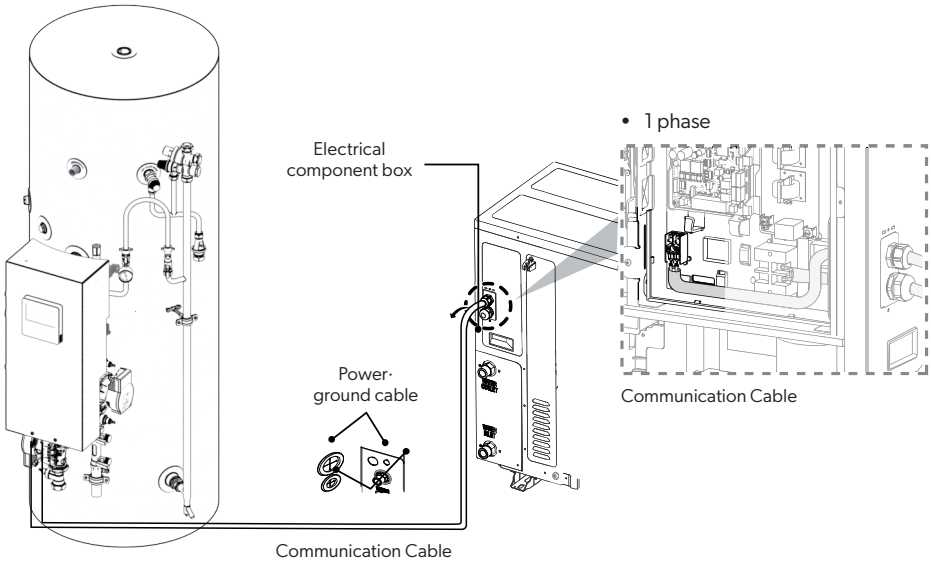
- Connect the wires to the terminal block and fix the cable with the cable tie.



- When installing electrical wiring: tension on the cable(s) must be avoided.
- Earth wire for the indoor unit and outdoor unit cables must be clamped to a suitable ring terminal clamp (not supplied)
- For the power cable, use the grade H07RN-F or H05RN-F materials.
- Power supply cords of parts of appliances for outdoor unit use shall not be thinner than polychloroprene sheathed flexible cord. (Code designation IEC:60245 IEC 57 / CENELEC: H05RN-F or IEC:60245 IEC 66 / CENELEC: H07RN-F)

To connect the communication cable

- The communication cable between the indoor and outdoor unit.
- Route the cable through the frame.
- Connect the wires to the terminal block and the earth screw (single side, the other end of the protective shield is not again connected to earth).
- Fix the cable with a cable tie.



- Specification of communication cable

Communication cable	Specifications
0.75 mm^2, 2 wires shielded	LiYCY

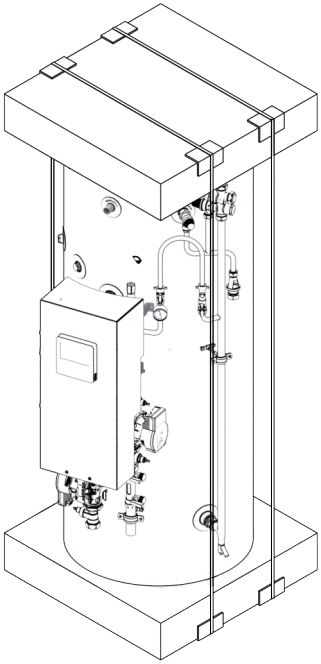
Installing the Indoor Unit

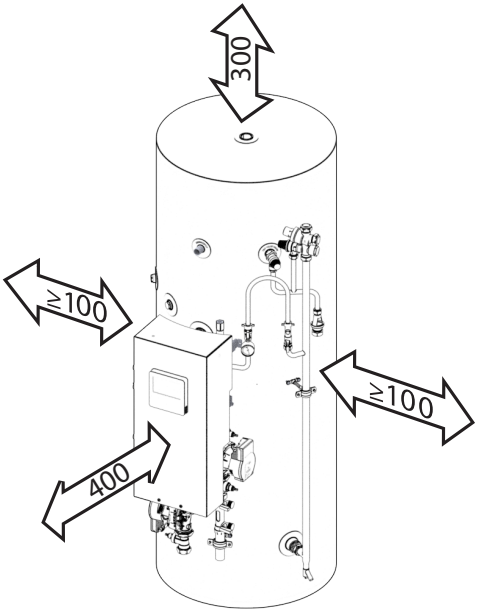
Moving the Indoor unit

- Select the moving route in advance.
- Be sure that moving route is safe from weight of the cylinder.

Moving the Indoor unit with a fork lift

- Insert the fork into the wooden pallet at the bottom of the cylinder carefully. Be careful that the fork does not damage the indoor unit.
- When moving the cylinder, be careful to not damage the cylinder by impact. Do not remove the packaging until cylinder has reached its final installation location.





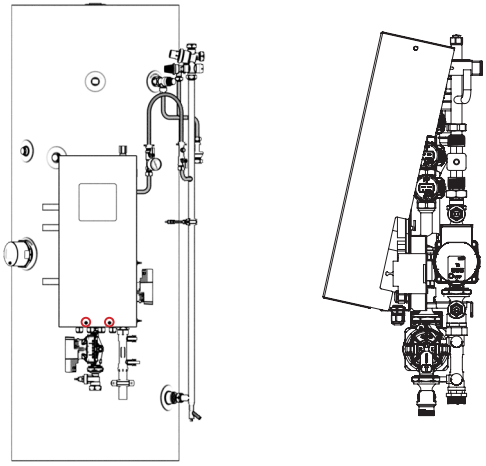
Installation space

- Ensure to leave the appropriate space as indicated in the drawing.
- Adhering to the installation space guidelines will ensure adequate ventilation so that the components of indoor unit will not be damaged from overheating.

Electrical Installation

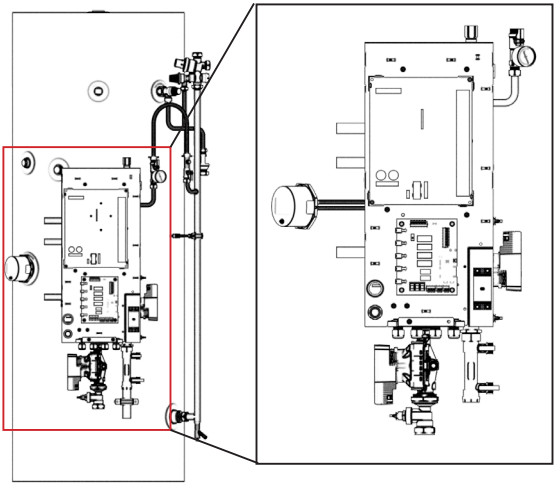
After removing the cover, disconnect the grounding plug.

Removing and Attaching the Manifold Cover



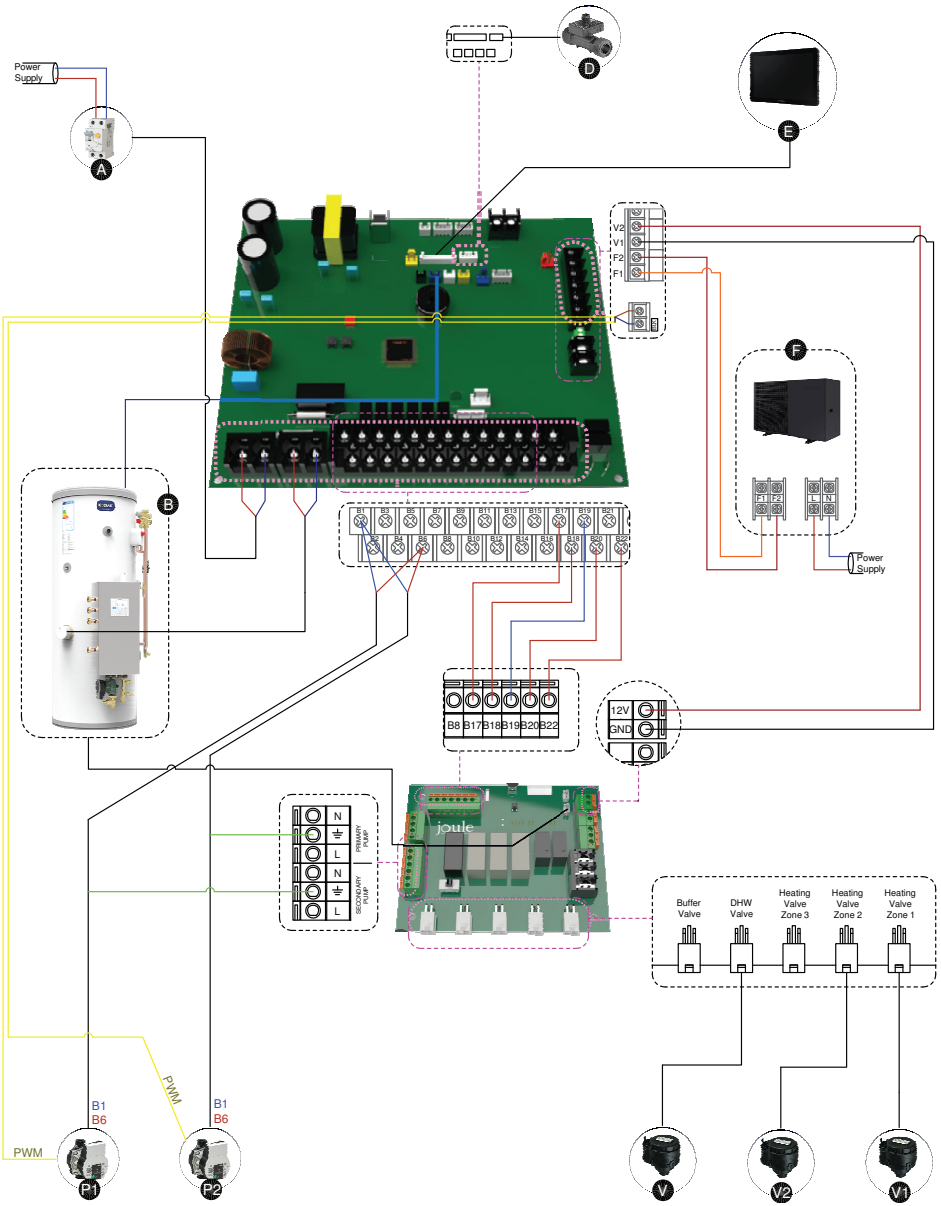
Remove the two M4 screws securing the front cover, then remove the cover. Disengage the earth connection tab. Take care with the Samsung controller cable and disconnect it if required.

Accessing Electrical Components



With front cover now removed full access can be gained to the electrical components of the system.

Please ensure cable entry glands are used.



	Description		Description
A	30A ELCB	P1	PRIMARY PUMP (PWM)
B	KODIAK TANK	P2	SECONDARY PUMP (PWM)
D	FLOW SENSOR	V	DHW - 2 PORT VALVE
E	GEN 7 CONTROLLER	V1	ZONE1 - 2 PORT VALVE
F	GEN 7 HEAT PUMP	V2	ZONE2 - 2 PORT VALVE

Power Supply

The table below outlines the power requirements for the Pre-Plumb tank

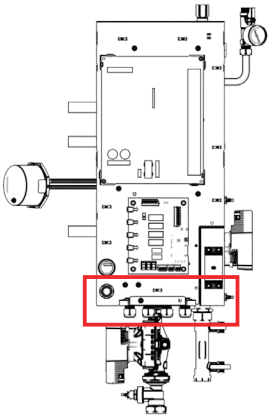
Indoor Unit	Load	Power Supply	Power Cable	MAX. Length	Type GL
			mm2 wires	m	A
MIM-E03(CN/DN)	[1]Booster Heater (3kw)	1Ø, 220-240Vac, 50Hz	4.0 / 3	<10m	20
			6.0 / 3	10m<L20m	20
	Booster Heater (~3kw) + Backup Heater (~3kw)		6.0 / 3	<10m	40
			8.0 / 3	10m<L20m	40

1) This is the standard setup in a Pre-Plumb tank.

Power Supply Cable Entry

All electrical wiring must be carried out by a competent installer and be installed in accordance with current local Wiring Regulations.

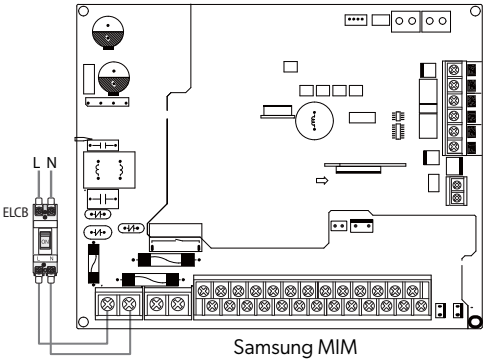
The cable entry point can be seen the diagram on the right. Remove the bottom vanity panel to access the cable fixing points and ensure all cables are secured using the fixings provided.



Power Supply Connections

Connect 'Live' and 'Neutral' power line with the terminals marked 'L, N' of the ELCB which is located inside the MIM casing.

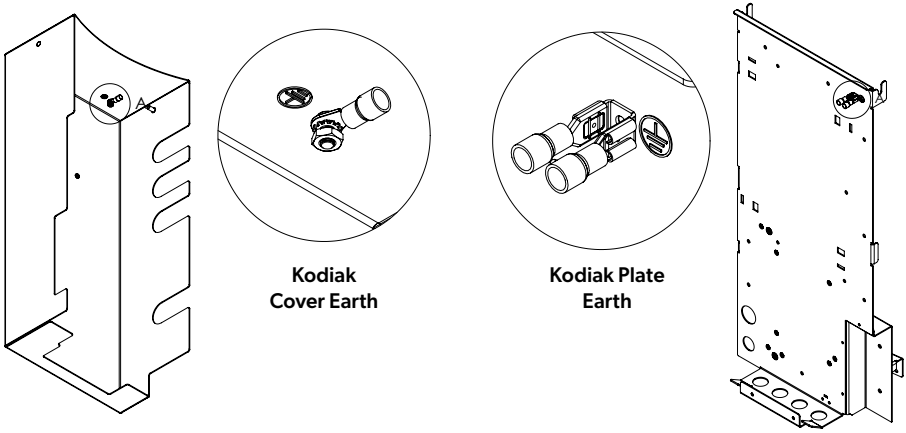
Connect the 'Protective Earth' line with the 'Earth screw' inside the MIM casing. The rear casing of the MIM is the termination point for all Protective Earth Connections. Please use earth termination points provided.



Samsung MIM

Protective Earth

All pre-installed components are earthed. The integrity of a protective earth system relies on its primary connection. It is the installers responsibility to ensure the rear of the Kodiak cover is earthed, therefore providing a protective earth connection to all system components.



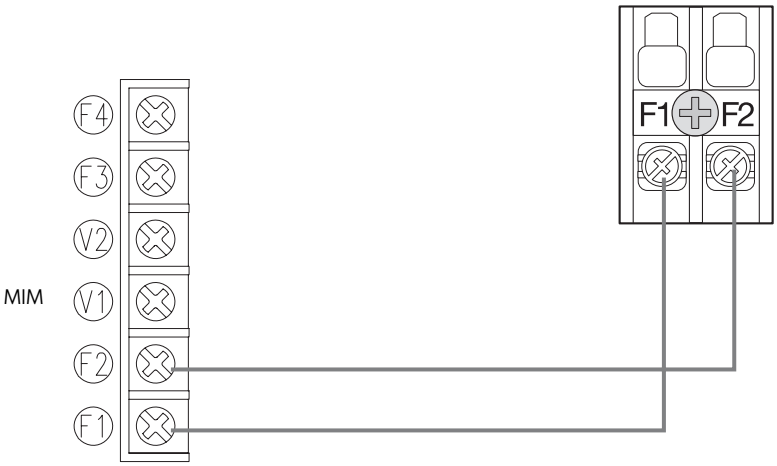
Kodiak Cover Earth

Kodiak Plate Earth

Connecting the communication cable

The communication cable carries the signal between the outdoor unit and the MIM casing.

Using a two-core cable connect the terminals F1 & F2 of the outdoor unit to the terminals F1 & F2 of the MIM casing.



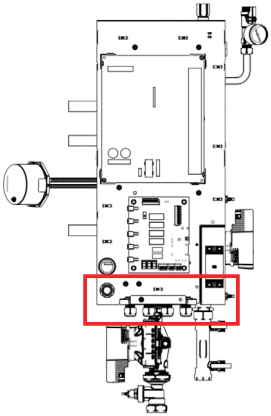
Connecting External Controls

Connection of external controls to the Smart Plumb unit are made directly to the 'Joule Kodiak PCB' which is located behind the top vanity panel, as detailed in the image shown on the right.

There is a dedicated 230V AC supply to power the external controls. These terminals are labelled 'External Controls Power' , specifically 'L, N & E' on the 'Joule Kodiak PCB'.

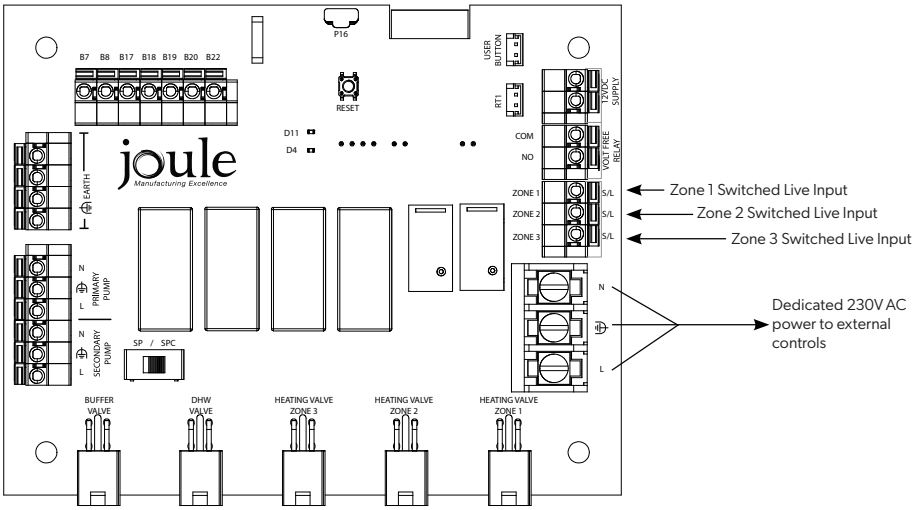
The switched live input from the external controls should be connected to the terminals labelled 'Zone 1' S/L, 'Zone 2' S/L and 'Zone 3' S/L on the 'Joule Kodiak PCB', as detailed in the image below.

N.B. Applying a 230V switched live to the terminal 'Zone 1' S/L will activate 'Heating Zone Valve 1'.



WARNING!

All external controls are 230V AC Connections

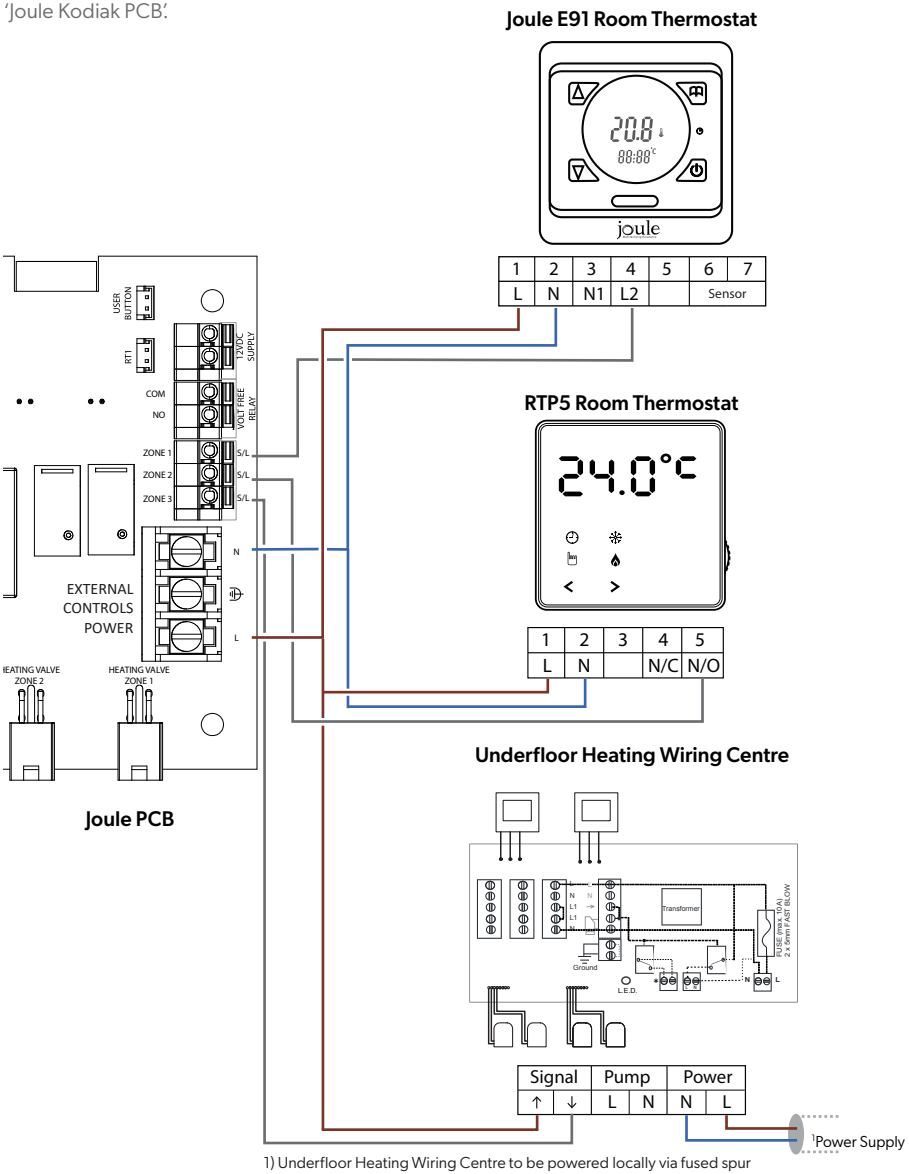


Joule Kodiak PCB

Electrical Installation

Example External Controls

The schematic below shows examples of different types of external controls and how they connect to the 'Joule Kodiak PCB'.



1) Underfloor Heating Wiring Centre to be powered locally via fused spur

2) For simplicity Earth connections have not been shown.

Temperature & Pressure Relief Valve

Connect the tundish and route the discharge pipe which must be routed in accordance with Building Regulations - Part G3 of schedule 1.

When operating normally water will not be discharged from the temperature and pressure relief valve. Water discharge from the temperature and pressure valve will only occur under fault conditions. The tundish is pre-fitted as shown below.

The discharge pipe (D2) coming from the tundish should terminate in a safe place where there is no risk to persons near the discharge, be of metal and:

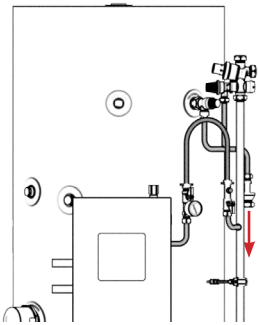
- Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long, i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on.
- Bends must be taken into account in calculating the flow resistance. Refer to Table 1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS6700 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.
- Be installed with a continuous fall. The discharge must be visible at the final point of discharge.

TABLE 1

	G1/2			G3/4			G1		
Min. size of discharge pipe D1	15mm			22mm			28mm		
Min. size of discharge pipework D2 from tundish	22mm	28mm	35mm	28mm	35mm	42mm	35mm	42mm	54mm
Max. length of straight pipe (no bends or elbows)	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm	Up to 9mm	Up to 18mm	Up to 27mm
Deducts the below from the maximum length for each bend or elbow in the discharge pipe	0.8m	1m	1.4m	1.0m	1.4m	1.7m	1.4m	1.7m	2.3m

Sizing of copper discharge pipe (D2) for a temp, relief valve with a G1/2 outlet size (as supplied)

Example of Discharge Arrangements



Heating System Pipework

Connecting To The Cylinder

If plastic pipes are used, they must be approved temperature resistant to 95°C at a pressure of 10 bar. A thermostatic mixer should be installed in the system to prevent the risk of scalding.

Heat Pump Primary Connections

Connect the primary connections as shown below. In the Kodiak Pre-Plumb the primary circulating pump is pre-fitted along with the hot water motorised valve.

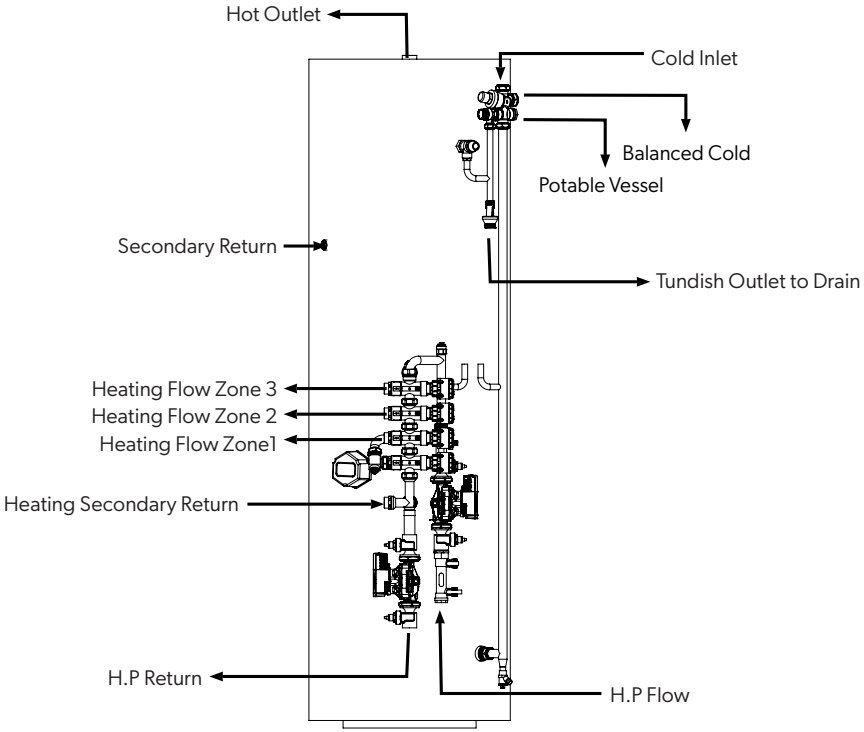
Bypass

The pre-plumb module is fitted with an automatic integral bypass to ensure a flow of water should all valves be in the closed position.

Heat System Pipe Connections

Connect the heating zone connections as shown below. In the Kodiak Pre-Plumb the heating zone motorised valves are pre-installed. The circulating pump for the heating system is also pre-installed.

All heating zone returns should be joined at the cylinder and return via heating return as shown below.



Inlet Control Group

The cold inlet must be piped into the top of the inlet control group. It is recommended to install a full bore isolation valve on the cold inlet for maintenance and servicing of the valve.

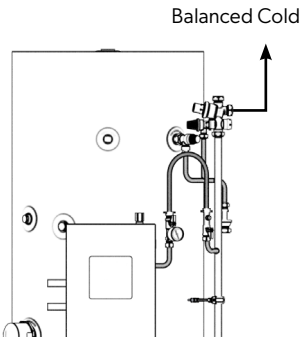
The water supply should be checked to ensure it can meet these requirements. If necessary, consult the local water authority regarding the likely pressure and flow rate availability. Consideration should be given to upgrading existing 1⁄2" (15mm) cold mains pipework to a larger size if the recommended minimum pressure / flow rate is not being achieved. Joule™ recommend that primary pipework used has a minimum diameter of 22mm to ensure low pressure loss.

Excess pressure can lead to the cylinder bursting. The inlet control set supplied has an expansion relief valve with a 15mm connection to allow it to be connected to a tundish, this is pre-plumbed. Make sure that there is enough space for future maintenance. The Inlet Control Group Pressure Reducing Valve is pre-set to 3-bar. In cases where the DYNAMIC (working) pressure is less than this, the pressure reducing valve should be set to match the DYNAMIC (working) pressure. This is required to prevent noise at the expansion vessel when water is drawn off, caused by higher STATIC pressures coming through the Inlet Control Group.

A high static (noflow) mains pressure is no guarantee of good flow availability. In a domestic installation 1.5bar and 25ltr/min should be regarded as the minimum. The maximum mains pressure that the inlet control set can cope with is 10bar.

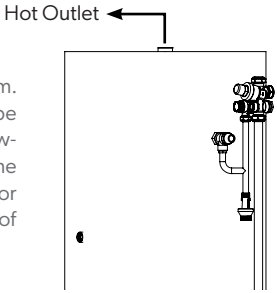
Potable Expansion Vessel

The expansion vessel receives the increased water volume when expansion takes place as the system heats up and it maintains a positive pressure in the system. The expansion vessel contains a flexible diaphragm, which is initially charged on one side with nitrogen, but can be topped up with air when required. Select a suitable position for the expansion vessel. Mount it to the wall using the bracket provided (0-24L only, 35L and above are floor standing) and hard fix into pipework and insulate. Ensure that the top of the vessel is accessible for servicing. The pipe connecting the expansion vessel to the system should have a diameter of not less than 15mm and must not contain any restrictions.



Hot Water Outlet

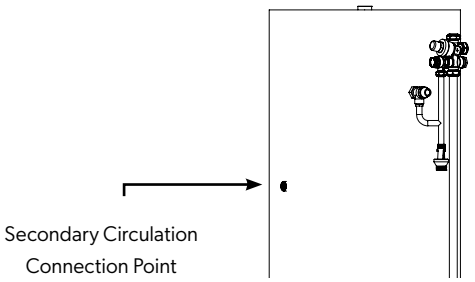
Run the first part of the hot water distribution pipework in 22mm. This can be reduced to 15mm and 10mm as appropriate for the type of tap etc. Your aim should be to reduce the volume of the hot draw-off pipework to a practical minimum so that the time taken for the hot water is as quick as possible. Do not use monobloc mixer tap or showers if the balanced cold connection is not provided. Outlets of this type can back pressurise the unit and result in discharge.



Potable Pipework

Secondary Circulation

On larger installations long pipe runs to draw-off points can cause significant volumes of water to be drawn off before an acceptable temperature can be reached. Secondary pumped circulation using a stainless steel or a bronze pump and combined with effective time and temperature controls can overcome this problem. Where secondary return circulation is required the pipework should be run in 15mm pipe and the pipework must be insulated to prevent excessive heat loss, leading to high running costs. A check valve must also be installed to prevent back flow. The secondary circulation tank connection can be seen diagram below.



Commissioning

Potable System

First the pre-charge pressure in the expansion vessel must be checked to verify its is 0.3 bar below the inlet group setting ex. 3 bar inlet = 2.7 vessel. The valve is of the Schrader car tyre type.

Check all the connections for water tightness including any factory-made connections such as the immersion heater and the temperature and pressure relief valve.

Prior to filling, open the hot tap furthest away from the cylinder to expel air. Open the cold main isolation valve and allow the unit to fill. Once the cylinder has been fully commissioned it should be heated to its normal operating temperature.

Filling and Flushing the System

Filling the heating System

The zone valves incorporated do not have a manual lever so they cannot be opened manually. The valves will remain in the last known state when power to the unit is disconnected. For this reason it is important to know if power has been applied to the unit as this will determine if the valves have remained open or have closed.

The Kodiak Pre-plumb cylinders are delivered with ALL heating and hot water zone valves OPEN.

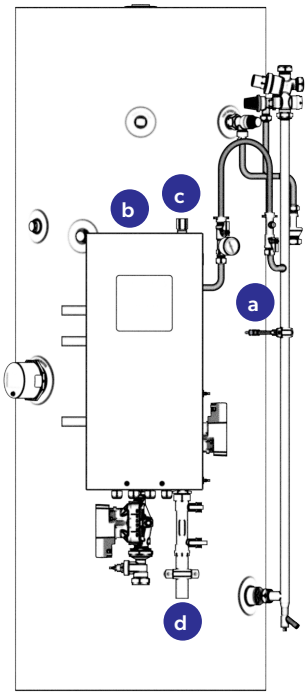
N.B. If it is unclear that power has been applied to the unit proceed to section 2.

1. Before the Heat Pump has been Powered On

If filling the system BEFORE the Heat Pump has been powered On, the heating and hot water zone valves are NOT required to be opened.

Follow the steps below to fill and vent the system in the correct order:

1. Ensure all system valves are open fully.
2. Fill the system using the incorporated **filling loop (a)** to the recommended pressure 1.5 bar.
3. Vent the **manual air vent (b)** on the units coil connection (highlighted below).
4. The incorporated **air vent (c)** is designed to release any trapped air in the units manifold.
5. Manually vent the all heat emitters to ensure all system air has been removed.
6. Ensure the system is watertight.
7. Connect the **fill & flush pump (d)** and circulate water around the entire system for approximately 1 hour.
8. On completion of the venting and flushing processes, disconnect the fill & flush pump and ensure the pressure remains within the recommended setting. If not, increase the pressure again using the filling loop.
9. Isolate both sides of the filling loop and disconnect the flexible section of the loop.



Heating System

2. After the Heat Pump has been Powered On

The Pre-plumb cylinders (Kodiak) are delivered with ALL heating and hot water zone valves OPEN so if the system is being filled AFTER the Heat Pump has been powered On, the heating and hot water zone valves WILL need to be opened.

1. Ensure all system valves are open fully.
2. Fill the system using the incorporated **filling loop (a)** to the recommended pressure 1.5 bar.
3. Vent the **manual air vent (b)** on the units coil connection (highlighted below).
4. The incorporated **air vent (c)** is designed to release any trapped air in the units manifold.
5. Manually vent the all heat emitters to ensure all system air has been removed.
6. Ensure the system is watertight.

Once the Heat Pump is powered On follow the remaining steps to flush each zone independently:

7. Connect the **fill & flush pump (d)** as outlined below.
8. Turn On the DHW setting to open the DHW zone valve. Ensure heating zones are switched off.

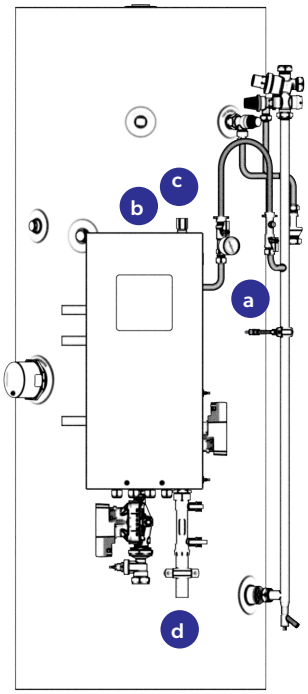
    8A Use the right and left arrows to high light the DHW function.

    8B Once highlighted push the power button and DHW should display.

    8C Once complete push to return to front Screen

    8D DHW is now active.

    8E Flush the DHW coil for approximately 15 minutes.

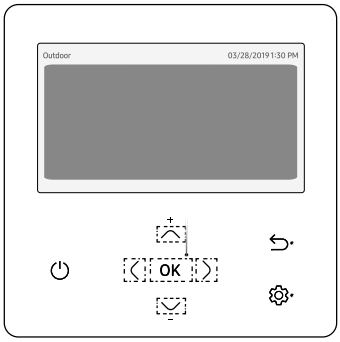


9. Turn Off the DHW setting and create a Heat Demand (by turning On all room thermostats).

10. Now the heating zones can be flushed to ensure all air has left the circuit(s), for approximately 45 minutes.

11. On completion of the venting process, disconnect the **fill & flush pump (d)** and ensure the pressure remains within the recommended setting. If not, increase the pressure again using the filling loop.

12. Isolate both sides of the filling loop and disconnect the flexible section of the loop.

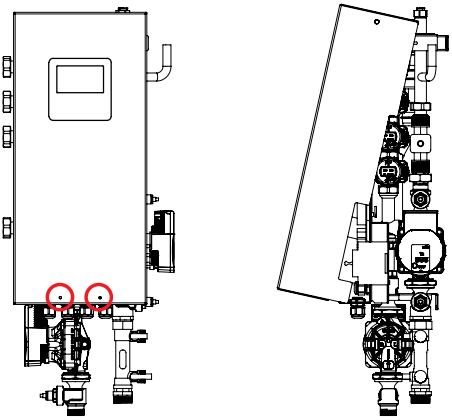


Accessing the Pre-Plumbed Components

Zone Valve Motor Head

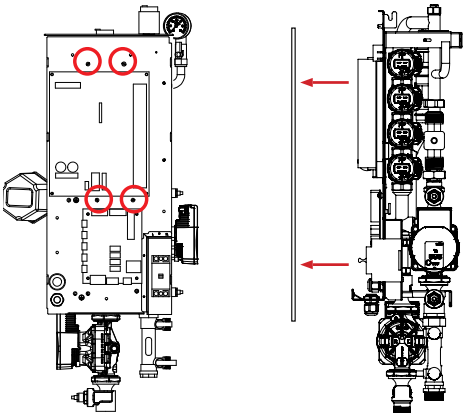
DANGER: Danger to life through electric shock! Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

Removing the Cover



Remove the cover by removing the 2 No. M4 screws around the perimeter of the front cover. On removal disengage the earth connection tab and controller quick release connection.

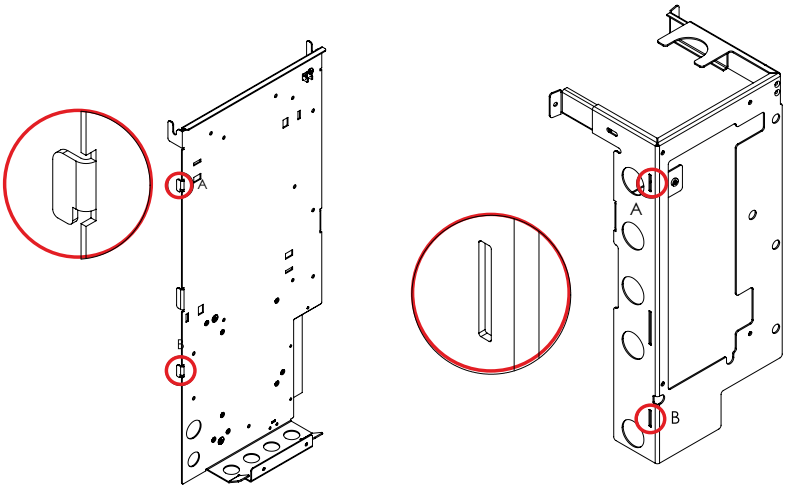
Removing the PCB Mounting Plate



Remove the PCB Mounting Plate from the Fixing Jig by removing the 4 No. M4 screws (2 No. above Samsung PCB and 2 No. between the Samsung and Joule PCB).

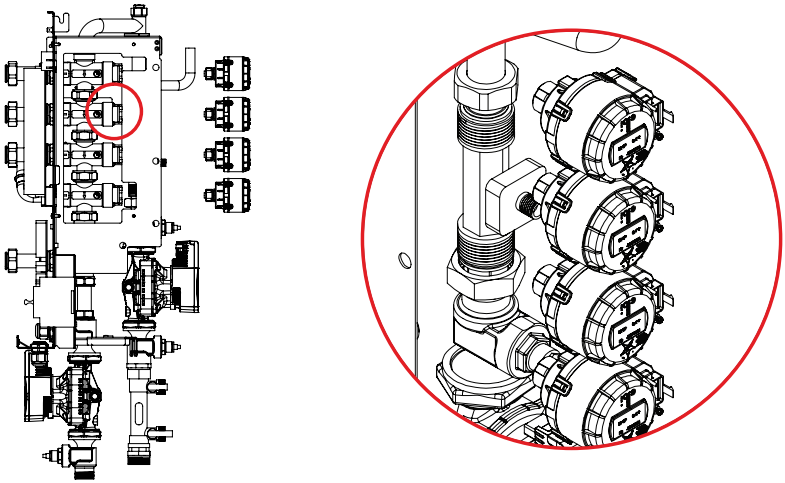
Note: Beware of cables connected

Accessing the manifold



Hang the PCB mounting plate from the fixing jig holes using the hooks on the left-hand side of the plate, as shown. The brass manifold is now accessible. Take care not to strain or damage connected cables.

Removing the Motor Head

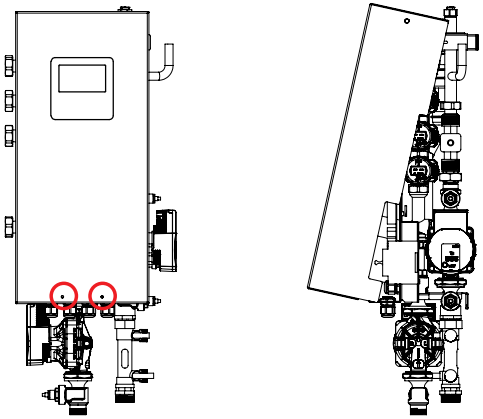


With access to the brass manifold all motor heads can be removed with disengaging the circlip as shown in the image. Once the circlip is out the motor head can be removed from the brass body.

Flow Sensor

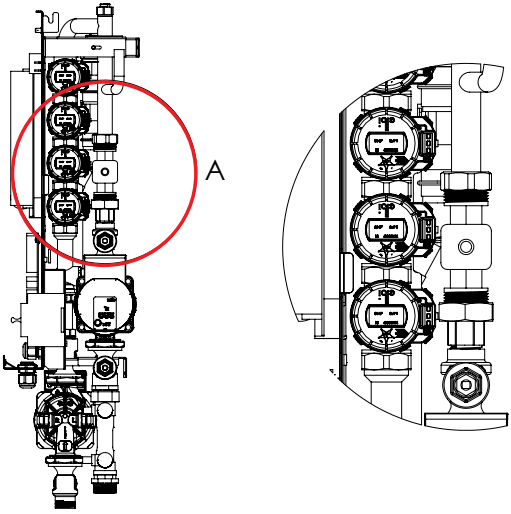
DANGER: Danger to life through electric shock!
Before carrying out any work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

Removing the Cover



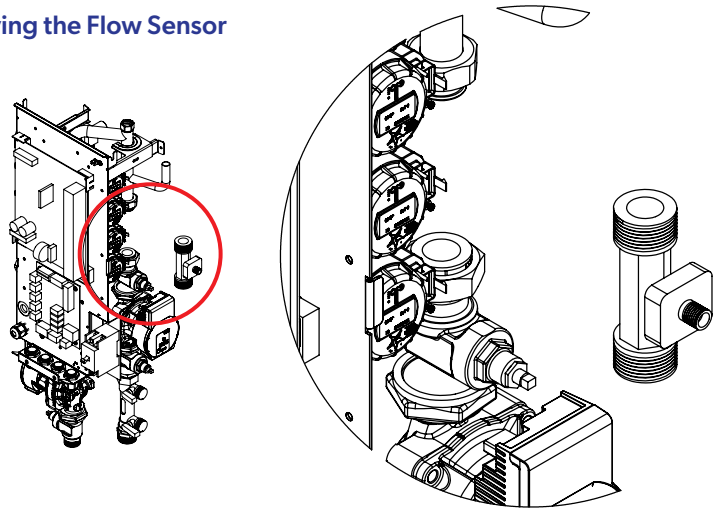
Remove the two M4 screws securing the front cover, then remove the cover. Disengage the earth connection tab. Take care with the Samsung controller cable and disconnect it if required.

Accessing the Flow Sensor



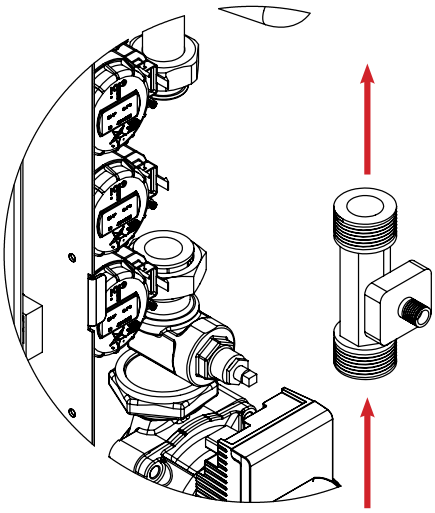
The flow sensor is accessed from the right-hand side and is connected by BSP nuts. Before replacing the sensor, ensure that the heating system is isolated or drained and disconnect the flow sensor cable. Loosen the BSP nut on each side of the sensor until both nuts are completely disengaged from the threads.

Removing the Flow Sensor



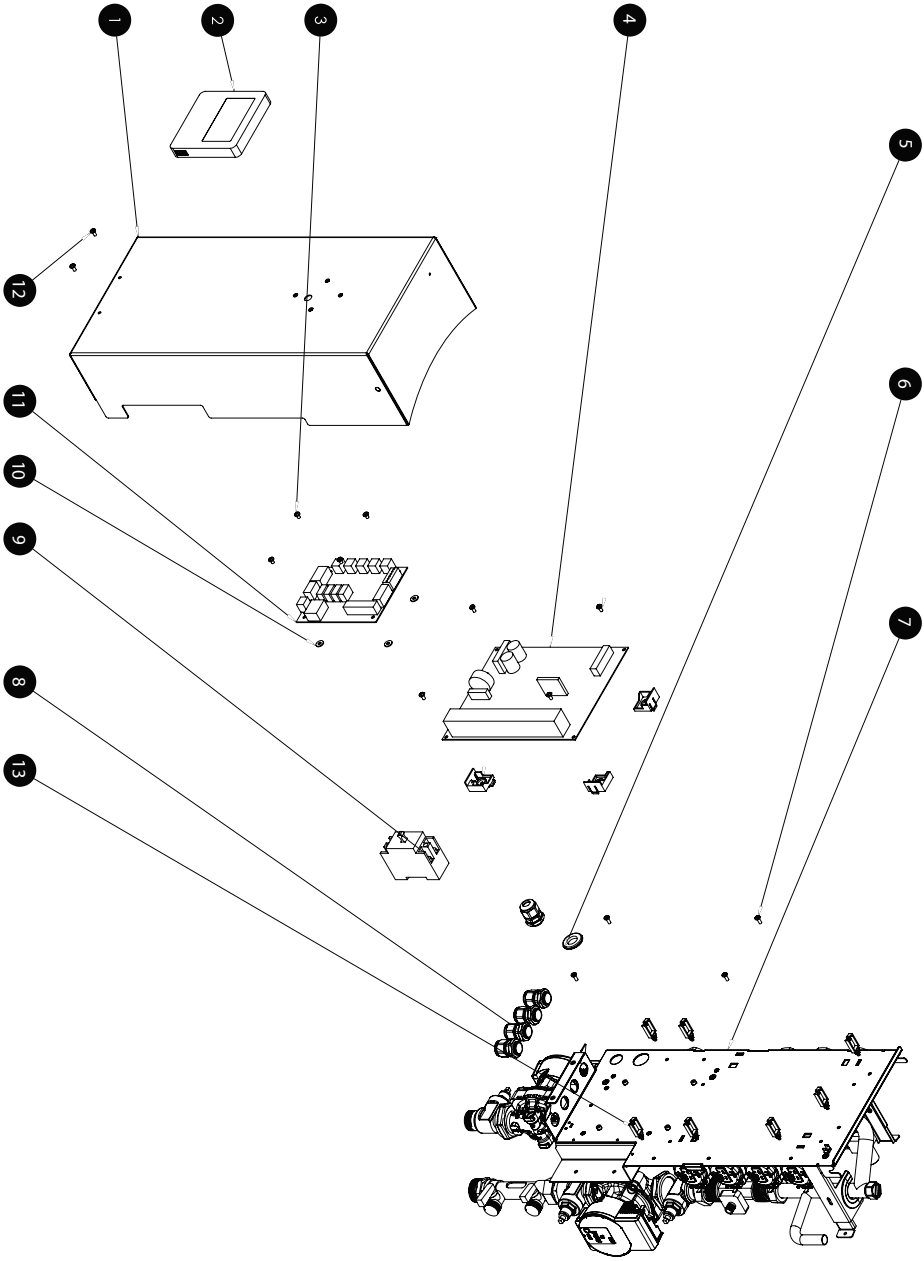
Once the nuts are free from the Flow Sensor threads the flow sensor can be taken out as shown in image.

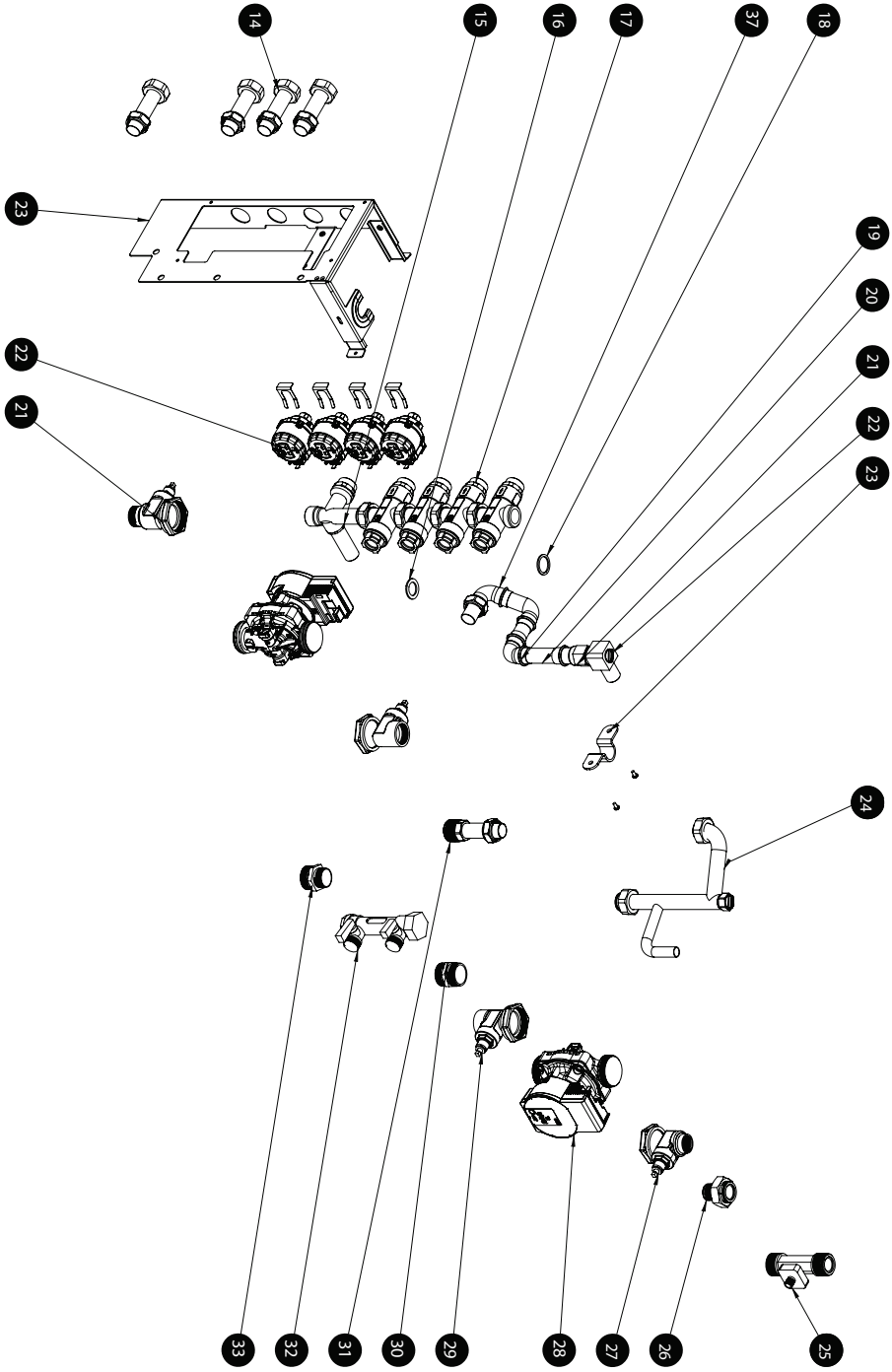
Replacing the Flow Sensor



On replacing the flow sensor make sure the direction of flow is correct.

Parts List




14
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Zone Valve Motor Head

Part No.	Description	Qty
HZHP-KDK-00COV	Project Kodiak: Cover	1
HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Controller	1
HMU-MS-M04X12N	M4 x 12mm Machine Screw NYLON	1
HZSMC-G600000J	Mono Control Centre Gen6 (RAW)	1
HZ-RS25-41-219	Rubber Grommet Cable Entry	1
HMU-MS-M04X012	M4 x 12mm Machine Screw	4
HZHP-KDK-00PLT	Project Kodiak: Plate	1
HMPYG-00000000	20MM PG GLAND	1
HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Electrical Breaker	1
HMU-NW-M04X0.8	M4 Plain Nylon Tap Washer, 0.8mm Thickness	4
TZ-W-0000000W	Joule Kodiak PCB - Rev C	1
HMU-PS-M4-0012	M4x12 pan posi screw RAL 9006	2
HMU-PUSH-SCLIP	Cable Clip Natural Push In Nylon Saddle Clip	7

Part No.	Description	Qty
TMPF-OUT-KOD-1	Heating zone Outlet	4
TZ-V-BMANIFOLD	15.1208 BY-PASS MANIFOLD	1
TZ-WASHR-30132	D0771 washer G1 (Ø30xØ13x2)	1
TZ-V-BMAN-LCKR	Brass Manifold Lock Ring	4
TZ-WASHR-30202	D0667 washer G1 (Ø30xØ20x2)	1
HMPF-00-415-22	22mm Press Elbow	1
HMPF-00-412-22	3/4" f X 22mm Press Straight Coupler	1
TZ-MANUALV-0.5	Pre Plumb 1/2'' BSP Manual Vent	1
HMPF-HPPP-ELB1	22mm Compression - Smooth Tube Brass Elbow	1
HMU-SP-CLIP22M	22mm Copper Pipe Saddle Clip	1
HMPF-HPPP-2ZPF/HMPF-HPPP-3ZPF	Project Kodiak: 3 Zone Primary FlowProject Kodiak: 2 Zone Primary Flow	1
HZSMC-G600000J	MONO CONTROL CENTRE GEN6 (UNCASED) - Flow Sensor	1
HMPF-RA-000134	1" BSP Female x 3/4" Male Reducing Adaptor	1
TBC	3/4" FEMALE PUMP VALVE	1
HZC-0000A25-60	circulating pump 25/60 (A rated)	2
HMPYV-0000028F	28MM FEMALE PUMP VALVE (ENG)	1
HM-FN-00028-28	1" to 1" BSP straight nipple	1
HMPF-ST-000221	22mm Smooth Tube x 1" BSP Male	1
HZK-0P-0000000	Combined Fill Flush + Flow Met	1
HMPF-00-411-29	411 28mm x 1" straight coupler	1
HMPYV-00000028	28MM PUMP VALVE (ENG)	1
TZM-I-PP0022MM	15.1221 Motorised Valve	4
HZHP-KDK-00FIX	Project Kodiak: Fixing Jig	1
HMPF-HPPP-ELB3	3/4'' BSP 90 Degree Brass Elbow	2

Maintenance and Servicing

General

Servicing should only be carried out by competent installers and any spare parts must be purchased from Joule.



Never bypass any safety devices or operate the unit without being fully operational.

Draining

Switch the electrical power off (important to avoid damage to element). Isolate the power supply to the unit. Turn off the cold water supply valve. Open hot water tap. Open the drain valve. The unit will drain.



Water drained off may be very hot!

Annual Maintenance

The Cylinder/ Indoor unit require annual servicing in order to ensure safe working and optimum performance. It is essential that the following checks are performed by a competent installer on an annual basis. This is commonly done at the same time as the annual heat pump service.

- Twist the cap for the expansion relief valve on the inlet control set and allow water to flow for 5 seconds. Release and make sure it resets correctly.
- Repeat with the pressure/temperature relief valve. In both cases check that the discharge pipework is carrying the water away adequately. If not, check for blockages etc. and clear.
- Check that any immersion heaters fitted are working correctly and that they are controlling the water at a temperature between 55°C and 65°C.
- Check the pressure in the expansion vessel is charged correctly. Turn off the water supply to the unit and open a hot tap first. The air valve on expansion vessel is a Schrader (car tyre) type.
- Air or CO2 may be used to charge the expansion vessel. Unscrew the head on the inlet control set and clean the mesh filter within.

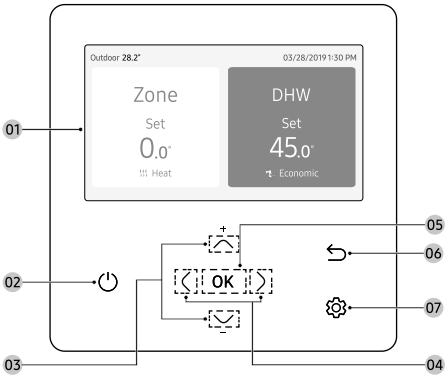
The Service Log Book supplied with this unit should be updated at each service.



Your guarantee may be void if you cannot produce proof of annual servicing.

Samsung Controller

Overview of the Samsung Controller Initial Start Up



Location	Function
1	**Operation status display -** Displays the operation/function settings and statuses.
2	**Operation On/Off button (LED display) -** Turns the Air to Water Heat Pump power On /Off
3	**Up/Down button -** Moves between items vertically or changes the set temperature.
4	**Left/Right button -** Moves between items horizontally or changes the item value.
5	**OK button -** Saves your new settings.
6	**Save & Return button -** Saves your new settings and returns to the previous step.
7	**Option button -** Selects the detailed setting function.

Initial Start Up

Please refer to controller symbols and button functions on this pageW for further guidance on the heat pump controls.

1. Ensure that both the outdoor and indoor units are correctly wired and plumbed prior to turning on.
2. Flush the system at 110% of system flow rate in both directions.
3. Once the system has been power flushed you must now fill the system with Ethylene Glycol.
4. The Ethylene Glycol should be pre mixed before putting it into the system and a solar filling station is ideal for filling the system, use the connections on the fill/flush and flow meter to add the Ethylene Glycol.
5. Do not put Neat Glycol into the system, failure to do this may cause the glycol to block the heat exchanger or block the pipes within the heat emitter circuit.
6. Run the solar filling station for at least an hour to purge all the air from the system.
7. Turn on power to the indoor unit first. Then turn on power to the outdoor unit second.
8. The outdoor unit will start flashing. It flashes 'scanning' while connecting the indoor and outdoor units.
9. Once scanning disappears from the screen the system is ready for testing.

Setting up the controller and the time

1. Push the Gear Icon
2. Use the Arrows to highlight option and push the right arrow
3. Use the down arrow until User mode is highlighted, then push the right arrow
4. Use the down arrow until Wired Remote is highlighted and push the right arrow
5. Use the Down arrow to Current time and push the right arrow
6. Date will be highlighted, push the right arrow and date format should be displayed.
7. Push OK, now you can set the date by using the arrows.
8. Once set push OK, and you should then return to the current time menu with date highlighted.
9. Use down arrow to highlight time and right arrow to enter time menu
10. Set clock to 24 hr format by using down arrow, then left and right arrows to high light hours and minutes.
11. Use up and down arrows to set the time.
12. Once complete push OK button.
13. Use the back button to return to the home screen.

How to Add or delete Schedules

1. Push the Gear Icon to enter the menu
2. Use the right arrow to high light schedule, then push ok
3. To add a schedule push ok, when add a schedule is highlighted
4. Select daily schedule using up and down arrows, push right arrow to enter
5. Select type of schedule using up and down arrows, change from quiet to DHW
6. Push right arrow to select either Off, or what power mode you wish for the DHW mode to start in.
7. We strongly recommend that standard is selected.
8. Use right hand arrow to highlight the hour and minutes, use up and down arrows to adjust.
9. Push OK to save.
10. To edit a schedule, use up and down arrows to highlight schedule, use left and right-hand arrow to select edit, push ok and repeat above steps to edit.
11. To delete schedule, highlight delete, push ok and schedule is deleted.
12. Push to return to home screen.

How to enter Service Mode

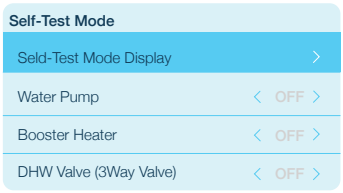
1. Using two hands, push and hold the up and down arrows for 10 seconds
2. Password will appear, the password is 0202
3. Use arrows to enter password
4. Push OK
5. You are now in the service Menu

Self-Test Mode

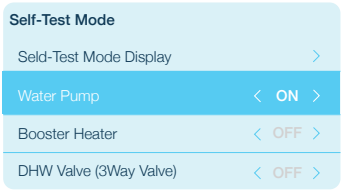
1. To access the Self-test mode, you must enter the Service Menu.



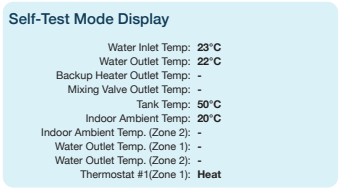
2. Once in the service menu Use the Down arrow to scroll down to self-test



3. Use the right arrow to enter the menu
4. Use the up and down arrows to highlight component to test
5. Once highlighted use the right arrow to enable component



6. You can go up to self-test display at any point, use the right arrow to enter



Field setting values

1. Enter Service mode
2. Use down arrow to highlight field setting value
3. Push right arrow to enter
4. Use up and down arrows to select sub menu required.
5. Example for weather comp and heating flow highlight 20 – water law
6. Push right arrow to enter sub menu
7. You will see the individual settings within this menu.
8. Use up and down to set FSV
9. Example 2011 Low set is 15, High set is 2.0
10. Once set push OK and Saving FSV will be displayed.
11. You will then return to the heat sub menu.
12. You can then use the up and down arrows to highlight other heat settings and right arrow to enter.
13. To go back to FSV menu use ⮌ and you can then move to other sub menus such as DHW.
14. To exit FSV mode push ⮌ until you return to the front Screen.

Energy Monitoring Function

1. In order to enable the energy monitoring function, please set FSV 3083.
2. Enter the service mode and go to FSV 3083 within the DHW settings.

3. Set 3083 to 3 kw.
4. Now use the ⮌ to return to the front screen.
5. Use the ⚙ to enter user menu, and use the arrows to highlight "Energy"
6. Push the ok button to enter this menu
7. Energy usage should be highlighted, push right arrow to enter
8. From here you have four options.
9. Instantaneous usage
10. Weekly energy usage
11. Monthly energy usage
12. Yearly energy usage
13. Use the arrows to navigate the menus.
14. Example: weekly usage> weekly consumption> display will then show current week, use left hand arrow to look at previous week.
15. Push ⮌ to return to previous sub menu or push several times to exit to home screen.

Turning on Heating and DHW

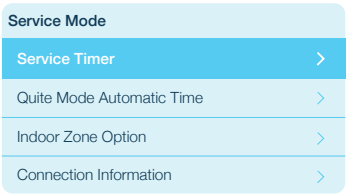
1. Use the ⮌ arrow to ensure you are on the front Screen
2. Use the right and left arrows to high light the function to turn on.
3. To turn on DHW, use the right arrow so DHW function is highlighted
4. Once highlighted push the power button and DHW should display.
5. To set temperature Push ok button whilst DHW is highlighted
6. Use up and down arrows to set water temperature
7. Push OK button to set power mode, this should be set for Standard.
8. Use up and down to select Standard and push OK.
9. Once complete push ⮌ to return to front Screen

To set heating to ON

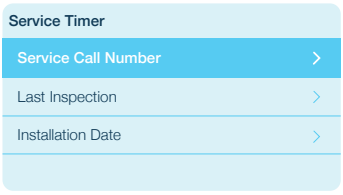
1. Use left and right arrows to highlight Zone
2. Push power button to enable heating
3. Screen display will show 0.0
4. Push the OK button to enter heating info
5. From here you can see flow temps
6. Use the ⮌ to exit this screen.
7. 0.0 must be on for the heat pump to detect run signals from the heating system.

How to setup service call number

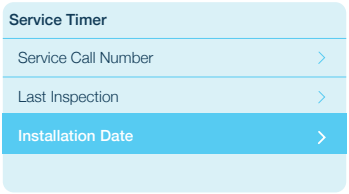
1.



2.



3.



Setting Quite Mode Manually

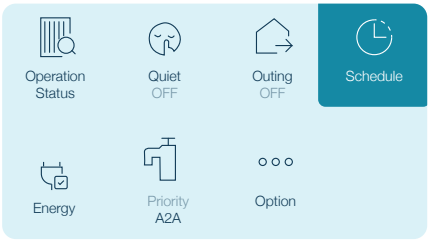
1. Push the Gear Icon to enter the menu
2. Quite mode can then be turned on or off manually by selecting the 'Quiet' icon
3. If quiet mode is turned on manually, the output of the heat pump will be reduced. Quiet mode must be switched to off to return the heat pump output to its normal capacity.



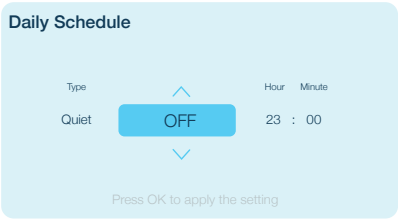


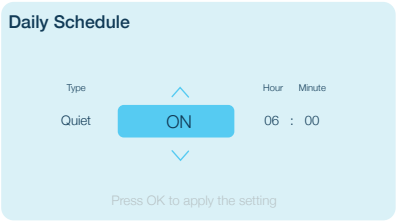
Setting Quite Mode Automatically

1. Push the Gear Icon to enter the menu
2. Enter the schedule menu



3. Select add a schedule

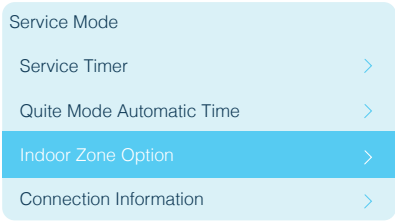




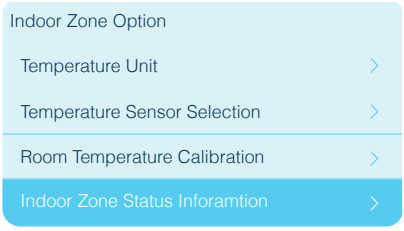
4. Choose to set the schedule daily weekly or yearly
5. Set the 'ON' and 'OFF' times for the schedule
6. Quiet mode when automatically come on during the chosen time period

How to read water flow rate

1. Enter Service mode
2. Use the arrows to move to 'Indoor Zone Option'



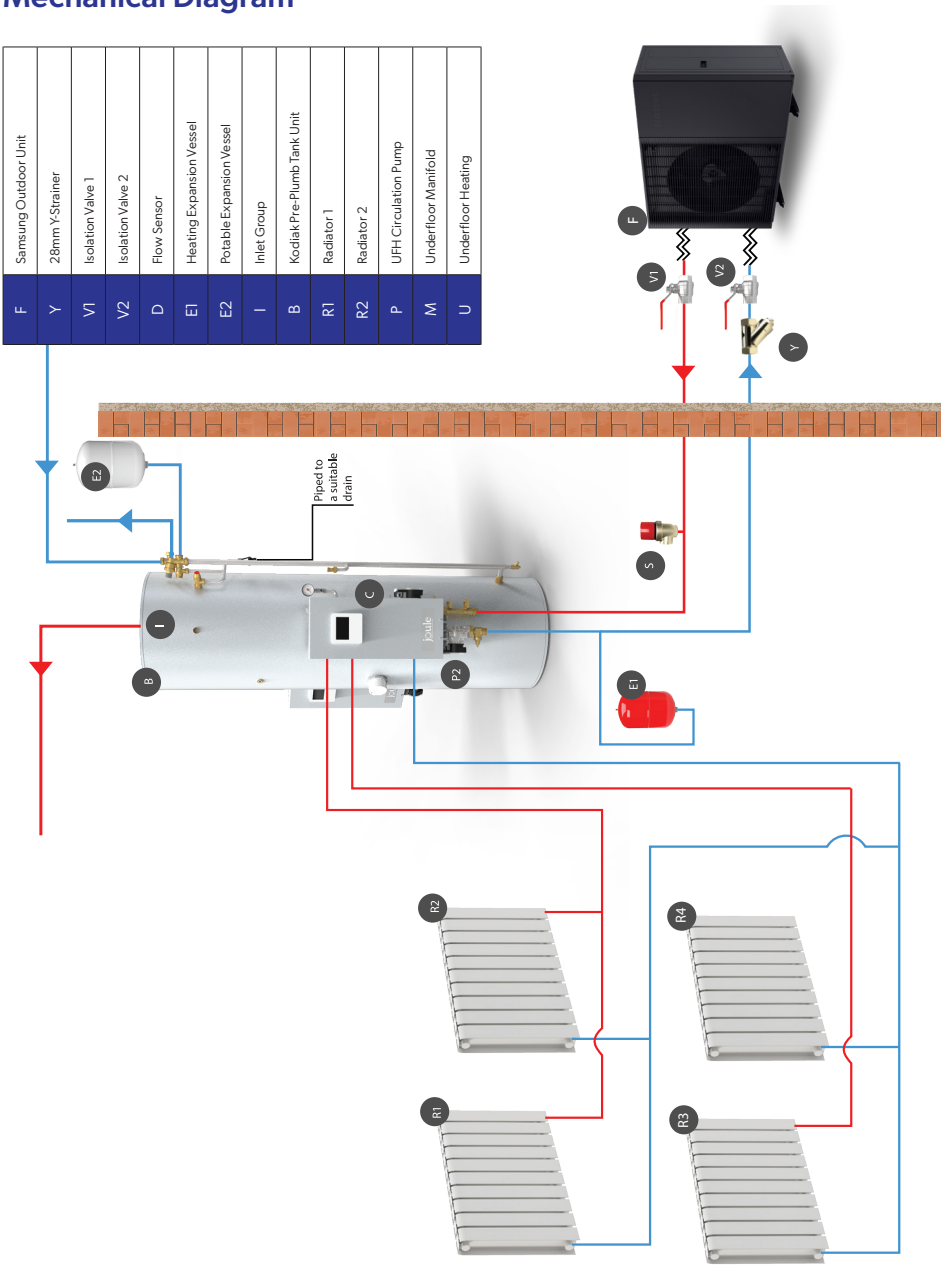
3. Press the right arrow button
4. Use the down arrow to find 'Indoor Zone Status Information'



5. Press the right arrow button
6. Use the down arrow to navigate to the 'Flow Sensor' information

Kodiak Installation

Mechanical Diagram



Field Setting Parameters

Field Setting Parameters for the Kodiak Pre-Plumb Cylinder

If you set a field setting and go back to check it, it will not have changed. The field setting does not get written to the PCB unless you push Ok after changing it.

Samsung Gen 6 Monobloc #FSV REVIEW -

Applicable Products: Kodiak Pre-Plumb Cylinder.

Menu Code	Menu Des.	Sub Menu code	Sub Menu Description	Function			Pre-commissioning Setting	#FSV Range		
				Item	Step	Unit		Default	Min	Max
10**	Remote Controller	105*	DHW Tank Temp.	Max.	1	°C	55	55	50	70
				Min.			40	40	30	40
20**	Water Law	201*	Outdoor Temp. For Water Law (Heat)	High	1	°C	2	-10	-20	5
				Low			15	15	10	20
		202*	Water Out Temp. for WL1 Heat (WL1.Floor)	Low: Target Value	1	°C	35	35	17	65
				High: Target Value	1	°C	45	45	17	65
		2091	External Thermostat Application #1 (Floor)	#1 (Floor)	-	-	Use(Signal ON/OFF) or WL Interlink OFF (Water Pump 2)	Not Use	Not Use	Use(Signal ON/OFF) or WL Interlink OFF (Water Pump 3)
30**	DHW	3011	Domestic Hot Water Tank	-	-	-	Use(Hysteresis) Thermo ON/OFF State	Not Use	Not Use	Use (Hysteresis) Thermo ON/OFF State
	Heat Pump	302*	3021 Max Temp.	-	1	°C	50	55	45	55
			3025 Max. DHW Operation Time	-	5	min	As per Table 1	60	5	95
	Booster Heater	303*	3035 Delay Time	-	5	min	As per Table 1	20	20	95
	Disinfection	304*	3042 Interval	-	1	day	TUESDAY	TUES	MON	SUN
			3043 Start Time	-	1	o' clock	3HOUR	3 HOUR	0 HOUR	24 HOUR
			3044 Target Temp.	-	5	°C	60	55	40	70
			3045 Duration	-	5	min	15	15	5	60
	Forced DHW Operation	305*	Forced DHW Operation	Timer OFF Function	-	-	Use	Not Use	Not Use	Use
				Timer Duration	10	min	60 min	60 min	30 min	300 Min

Table: 1

#FSV	Tank Volume	Setting
3025 & 3032	≤ 180	50
	200	60
	230	70
	250	75
	300	90
	≥ 400	95

Error Codes

Display	Explanation	Error Source
101	Hydro Unit / Outdoor Unit communication connection error	Hydro Unit
105	Wi-Fi communication error	Hydro Unit
109	Address incomplete communication error	Hydro Unit
120	Short- or open-circuit error of the room temperature sensor of the Zone 2 indoor unit (detected only when the AI Home temperature data is used)	Hydro Unit
121	Short- or open-circuit error of the room temperature sensor of the Zone 1 indoor unit (detected only when the AI Home temperature data is used)	Hydro Unit
122	EVA Inlet temp sensor SHORT or OPEN	Hydro Unit
123	EVA Outlet temp sensor SHORT or OPEN	Hydro Unit
162	EEPROM Error	Hydro Unit
163	EEPROM OPTION SETTING ERROR	Hydro Unit
198	Error of Terminal Block's Thermal Fuse(Open)	Hydro Unit
201	Hydro Unit / Outdoor Unit communication error(Matching error)	Hydro Unit/ Outdoor Unit
202	Hydro Unit / Outdoor Unit communication error(3 min)	Hydro Unit/ Outdoor Unit
203	Communication error between INVERTER and MAIN MICOM (4 min)	Outdoor Unit
205	Main PBA - load PBA Communication error	Outdoor Unit
221	Outdoor Unit air temperature sensor error	Outdoor Unit
231/241	Condenser temperature sensor error	Outdoor Unit
251/261	Discharge temperature sensor error	Outdoor Unit
266/276	Compressor top temperature sensor error	Outdoor Unit
269/308	Compressor suction temperature sensor error	Outdoor Unit
291	High pressure sensor SHORT or OPEN	Outdoor Unit
296	Low pressure sensor SHORT or OPEN	Outdoor Unit
320	OLP sensor error	Outdoor Unit
321	EVI inlet temp sensor error	Outdoor Unit
322	EVI outlet temp sensor error Inverter1 PCB overheat error	Outdoor Unit
381	Inverter1 PCB overheat error	Outdoor Unit
403	Plate heat exchanger freeze detection (During cooling operation)	Outdoor Unit
404	Protection of Outdoor Unit when it is overload (during Safety Start, Normal operation state)	Outdoor Unit
407	Plate heat exchanger freeze detection (During cooling operation)	Outdoor Unit

Display	Explanation	Error Source
410	Comp down due to low pressure sensor	Outdoor Unit
416	Discharge of a compressor is overheated	Outdoor Unit
419	OUTDOOR UNIT EEV operation error	Outdoor Unit
428	Comp down due to pressure ratio control	Outdoor Unit
436	Plate heat exchanger freeze detection (During heating operation)	Outdoor Unit
438	Error due to excessive open of EVI EEV	Outdoor Unit
439	Refrigerant leakage error	Outdoor Unit
440	Heating operation blocked (outdoor temperature over 35 °C)	Outdoor Unit
441	Cooling operation blocked (outdoor temperature under 9 °C)	Outdoor Unit
443	Compressor lock due to low pressure	Outdoor Unit
450	Error due to high cond temperature	Outdoor Unit
458	OUTDOOR UNIT fan1 error	Outdoor Unit
461	[Inverter] Compressor startup error	Outdoor Unit
462	[Inverter] Total current error/PFC over current error	Outdoor Unit
463	OLP is overheated	Outdoor Unit
464	[Inverter] IPM over current error	Outdoor Unit
465	Compressor overload error	Outdoor Unit
466	DC LINK over/low voltage error	Outdoor Unit
467	[Inverter] Compressor rotation error	Outdoor Unit
468	[Inverter] Current sensor error	Outdoor Unit
469	[Inverter] DC LINK voltage sensor error	Outdoor Unit
470	Outdoor unit EEPROM Read/Write Error	Outdoor Unit
471	Outdoor unit EEPROM Read/Write Error(OTP error)	Outdoor Unit
474	IPM(IGBT Module) or PFCM temperature sensor Error	Outdoor Unit
475	Outdoor Unit Fan2 error	Outdoor Unit
484	PFC Overload Error	Outdoor Unit
485	Input current sensor error	Outdoor Unit
488	AC Input Voltage Sensor Error	Outdoor Unit
500	IPM is overheated	Outdoor Unit
507	Comp down due to high pressure switch	Outdoor Unit
536	PHE refrigerant leak error	Outdoor Unit
554	Gas leak error	Outdoor Unit
590	Inverter EEPROM Checksum error	Outdoor Unit

Display	Explanation	Error Source
601	Communication error between the Hydro Unit and AI Home	Hydro Unit
604	Communication tracking error between the Hydro Unit and AI Home	Hydro Unit
653	AI Home temp sensor SHORT or OPEN	Hydro Unit, AI Home
654	Memory(EEPROM) Read/Write Error (AI Home data error)	Hydro Unit, AI Home
670	Controller combination error	Outdoor Unit
896	Water outlet temperature sensor (Tw5) for external heater short or open	Outdoor Unit
897	Water Tank in sensor error (open/short)	Outdoor Unit
899	Short- or open-circuit error of the Zone 1 water-out temperature sensor	Outdoor Unit
900	Short- or open-circuit error of the Zone 2 water-out temperature sensor	Outdoor Unit
901	Water inlet (PHE) temperature sensor error (open/short)	Outdoor Unit
902	Water outlet (PHE) temperature sensor error (open/short)	Outdoor Unit
903	Water outlet (backup heater) temperature sensor error	Outdoor Unit
904	DHW tank temperature sensor error	Outdoor Unit
906	Refrigerant gas inlet (PHE) temperature sensor (open/short)	Outdoor Unit
907	Error due to pipe rupture protection	Hydro Unit
908	Error due to freeze prevention (Re-operation is possible)	Hydro Unit
909	Error due to freeze prevention (Re-operation is impossible)	Hydro Unit
910	Water temperature sensor on water outlet pipe is detached	Hydro Unit
911	Flow Switch Off Error, When Water pump is running	Hydro Unit
913	Six times detection for Flow Switch Error (Re-operation is not possible)	Hydro Unit
914	Error due to incorrect thermostat connection	Hydro Unit
915	Error on DC fan (Non-operating)	Hydro Unit
916	Mixing valve sensor error	Hydro Unit
917	Water Tank Sensor configuration error	Hydro Unit
919	Error that the set temperature for disinfection operation is not reached,or after reaching, the temperature fails to continue for the requested time	Hydro Unit
920	FSV SD card data error	Outdoor Unit
973	Water pressure error(open/short)	Outdoor Unit

Troubleshooting Tips

Display	Explanation
120	Short- or open-circuit error of the room temperature sensor of the Zone 2 indoor unit (detected only when the AI Home temperature data is used)
121	Short- or open-circuit error of the room temperature sensor of the Zone 1 indoor unit (detected only when the AI Home temperature data is used)
653	AI Home thermistor SHORT or OPEN
896	Water outlet temperature sensor(Tw5) for external heater short or open
897	Water tank in sensor error SHORT or OPEN
899	Zone1 Water Outlet Thermistor SHORT or OPEN
900	Zone2 Water Outlet Thermistor SHORT or OPEN
901	Water Inlet thermistor SHORT or OPEN (Split models only)
902	PHE Outlet thermistor SHORT or OPEN (Split models only)
903	Water Outlet thermistor SHORT or OPEN
904	Water TANK thermistor SHORT or OPEN
916	Mixing Valve thermistor SHORT or OPEN

Communication

Display	Explanation
105	Wi-Fi communication error
601	Communication error between AI Home and the Hydro unit
604	Tracking error between AI Home and the Hydro unit
654	Memory(EEPROM) Read/Write Error (AI Home data error)
670	Controller combination error

Water pump & Flow Sensor

Display	Explanation
E911	Low flow rate error • in case of low flow rate in 30 sec during water pump signals is ON(Starting) • in case of low flow rate in 15 sec during water pump signals is ON(After starting)

E911

- Water pump ON (Low flow rate) : NOT enough water flow



Water flow range

Product Code	Water flow rates (LPM)	
	Min	Max
AE050CXYDEK	7	48
AE080CXYDEK	7	48
AE120CXYDEK	7	48
AE160CXYDEK	7	48

Maintenance and Servicing

Annual Servicing

All Samsung Air Source Heat Pumps supplied by Joule must be serviced annually to validate the product warranty under the terms of the EUW[1] agreement. Items that must be inspected annually to validate the warranty include,

- Check outdoor fan motor and lubricate if needed
- Check electrical wiring, contacts and terminals; repair as required
- Check all safety components
- Check compressor operation
- Check indoor thermostat operation
- Check defrost and heating modes (winter only)
- Check for excessive noise and vibration
- Check refrigerant charge
- Inspect air filters
- Check all safety and pressure switches
- Check motor and heaters/voltage/amperes

An annual service must be carried out by a suitable qualified engineer to validate the terms of the Joule EUW agreement.

[1]. EUW = Extended Warranty Period

Warranty

Standard Warranty Period And Extended Warranty Period

The warranty period starts on the date of installation as shown on the commissioning report. The standard warranty period ends 24 months later. By registering the product(s) which can be done either by yourself, or by the reseller from whom you have purchased the products (the "Reseller") within 28 days after the installation date, you will receive an additional 5 year extended limited warranty service depending on the product type which will bring the total period of coverage to 7 years from the date of installation. All of the terms set in this Statement of Limited Warranty shall apply to any extended warranty. The method of service and operating conditions will be as described in the original warranty statement provided with the Samsung Product. Subject to completion of Samsung installer training courses.

Warranty: Redemption Process & Details

1. This promotion cannot be used in conjunction with any other promotion(s) or special bid/tender pricing offered by Samsung Electronics.
2. This offer applies to models purchased after 00:01hrs (GMT) on 1st May 2016.
3. Upon registration the claimant will be sent an email confirmation with notification of registration and a related reference number for the claim being registered on.
4. A copy of your invoice and commissioning report MUST be submitted as proof of purchase.
5. Proof of dispatch will not be accepted as proof of receipt.
6. The 7 Year Extended Warranty is not transferable and no alternative will be offered.

Statement For Samsung

1. This offer only applies to the purchase of a new (not second-hand) Samsung air conditioning Product which is sold in the UK or ROI after 1st May 2016

Product	Model	Warranty Type
All EHS Product	various	7 years On Site

2. For customers outside the UK & ROI please refer to the country specific warranty information that came with your product.
3. All Extended Warranty Redemptions must be registered online within 28 days of installation.
4. This Promotion is only available to end user customers who are using the products for business purposes.
5. Employees or agents of Samsung or their families or households or anyone professionally connected to this promotion is not eligible.
6. By registering for the Extended Warranty you agree to be bound by these terms and conditions.

Extent Of Warranty

During the extended warranty period Samsung continues to warrant that the Samsung Product shall be free from defects in materials and workmanship. If the relevant product does not function as warranted, against defective materials or workmanship, you should contact the Joule technical department or your local sales representative.

Samsung Maintenance Parts, Supplies and Optional accessories (i.e. consumables), supplied as part of the initial Samsung Product installation and listed in the Samsung Product User Guides, is warranted against defective materials or workmanship for the first 6 months, from date of Samsung Product purchase or recommended average life volume, whichever is achieved first, but is excluded from the Extended Warranty period.

When Warranty service involves the exchange of a product or part, subject to applicable law, the item replaced becomes the property of Samsung.

The replacement item assumes the remaining warranty period of the original product.

Before you present the product(s) for On Site (IH) warranty service you must:

- Ensure that the Product is available for Warranty repair, on Site at the registered address.

Claim(s) For Warranty Service

To obtain a Warranty service, you must:

- Contact the Joule technical department or your local sales representative.
- Provide the full product model code and serial number
- Provide proof of activated extended warranty and proof of annual maintenance contract as per the e-mail confirmation sent at the time of online warranty registration(s)
- Provide a clear fault description and carry out any diagnostics as advised
- Comply with any reasonable instructions from Samsung or an Authorised Service Centre to allow you to receive the warranty service

Transfer Of Product

If you transfer this product to another user, warranty service may be available to that user during the remainder of the standard 24 month warranty period, but not during any extended warranty period (i.e. the extended warranty is not transferable).

Exclusions

Samsung makes no representation or guarantee that the Samsung product(s) will operate uninterrupted or error free.

During the Extended Warranty Period, Samsung will only provide the Warranty in the UK and ROI.

Samsung is not responsible for paying any travel or delivery costs where the product is located outside the UK or ROI.

Services performed by Samsung in rectifying damage or defect caused as a result of any excluded conditions shall be subject to additional charges for labour, transportation and parts.

The Extended Warranty is only available if you have an ongoing maintenance contract in place with a maintenance provider approved by Samsung, under which the product(s) must be checked at least once a year by that maintenance provider.

Warranty Service is not available to you if the product you present is:

- Defaced
- Altered
- Damaged beyond repair, or
- In need of a repair not included in Warranty service. (e.g. Periodic Maintenance, consumable replacement and the repair or replacement of parts due to normal wear and tear) transportation damage, or any other damage caused by external factors (i.e. not damage caused by issues inherent in the manufacturing of the product)
- Does not match Product Model and serial number details as registered for Warranty service

To the maximum extent permitted by law, warranty service does not include repair of failures caused by:

- Modification or attachments
- Accidents or misuse
- Unsuitable physical or operating environment
- Third party products, generic or refilled e.g. maintenance units or replacement parts
- Maintenance by anyone other than Joule or a Joule authorised service provider.
- Operation of a product beyond the limit of its duty cycle or Product specifications
- Products, components, parts, material, software, or interfaces not furnished by Samsung

Neither Samsung nor its third party suppliers or resellers make any other warranty, guarantee, or condition of any kind, whether express, implied, legal or statutory, with respect to the product(s), and to the extent permitted by applicable law, specifically disclaim any implied, legal or statutory warranties or conditions or merchantability, fitness for a particular, general or normal purpose, satisfactory quality, durability and warranties against latent defects.

General Terms Of Promotion

1. These terms and conditions are governed by English law and come under the English courts shall have exclusive jurisdiction to settle and resolve any dispute which may arise in connection with the validity, effect, interpretation and/or performance of these terms.

2. By registering for the extended warranty you agree to be bound by these terms and conditions.

3. The Promoter shall have the right, where necessary, to undertake all such action as is reasonable to protect itself against fraudulent or invalid claim(s) including, without limitation, to require further verification as to the identity, and other relevant details of an entrant or claimant and/or the verification as to their qualifying purchase.

4. The Promoter reserves the right, acting reasonably and in accordance with all relevant legislation and codes of practice, to vary the terms and conditions of this Promotion.

5. Promoter: Samsung Electronics (UK) Ltd, Samsung House, 1000 Hillswood Drive, Chertsey, Surrey, KT16 0PS. (Please do not send any Warranty applications to this address - they will not be registered for Warranty promotion).

Joule Kodiak

The **JOULE Kodiak** stainless steel vessel carries a fully transferable 25-year guarantee against faulty materials or manufacture provided that:

- It has been installed in the United Kingdom or the Republic of Ireland as per the instructions provided in the installation manual provided with the cylinder and in accordance with all of the relevant standards, regulations and codes of practice in force at the time.
- It has not been modified in any way, other than by JOULE
- It has not been misused, tampered with or subjected to neglect.
- The system is fed from the public mains water supply.
- It has only been used for the storage of potable water.
- It has not been subjected to frost damage.
- The unit has been serviced annually.
- The Service Log Book has been completed after each annual service.
- The product must be registered online using the product registration form available on the JOULE website **https://share-eu1.hsforms.com/1GRGiJyamTRC3XexotbJYhwf3nqg**

Exclusions

The guarantee does not cover cylinders affected by the following;

- The effects of scale build up on the cylinder.
- Any labour charges associated with replacing the unit or its parts.
- Any consequential losses caused by the failure or malfunction of the unit.

Please note that invoices for servicing may be requested to prove that the unit has been serviced annually.

Unvented Kit & Other Components

The expansion vessel and cold water controls supplied with JOULE models carry a 1-year guarantee. All other components that are fitted to, or supplied, with the unit carry a 1-year guarantee.

Notes

SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Cylinder Make and Model _____

Cylinder Serial Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Commissioned by (print name) _____ Registered Operative ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number (if applicable) _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

Is the primary circuit a sealed or open vented system?	Sealed ☐	Open ☐
What in the maximum primary flow temperature?		°C

ALL SYSTEMS

What is the incoming static cold water pressure at the inlet to the system?			bar
Has a strainer been cleaned of installation debris (if fitted)?	Yes ☐	No ☐	
Is the installation in a hard water area (above 200ppm)?	Yes ☐	No ☐	
If yes, has a water scale reducer been fitted?	Yes ☐	No ☐	
What type of scale reducer has been fitted?			
What is the hot water thermostat set temperature?			°C
What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)?			l/min
Time and temperature controls have been fitted in compliance with Part L of the Building Regulations?		Yes ☐	
Type of control system (if applicable)	Y Plan ☐ S Plan ☐	Other ☐	
Is the cylinder solar (or other renewable) compatible?	Yes ☐	No ☐	
What is the hot water temperature at the nearest outlet?			°C
All appropriate pipes have been insulated up to 1 metre or the point where they become concealed		Yes ☐	

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?			
What is the pressure reducing valve setting?			bar
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?	Yes ☐	No ☐	
The tundish and discharge pipework have benn connected and terminated to Part G of the Building Regulations		Yes ☐	
Are all energy sources fitted with a cut out device?	Yes ☐	No ☐	
Has the expansion vessel or internal air space been checked?	Yes ☐	No ☐	

THERMAL STORES ONLY

What store temperature is achievable?		°C
What in the maximum primary flow temperature?		°C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations	Yes ☐
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature

Customer's Signature

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notfied to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE MARK

THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

joule

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